

Key trends in IoT connectivity

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'Transition Topics' for 2024

IoT and data regulations

The new data landscape
and impact on IoT

IoT Application
Enablement Platforms
(AEPs)

Market segmentation,
channels and partner
programmes

Contextualisation

Video analytics enabled
by AI

eSIM, particularly SGP.32

2G/3G sunseting and
implications for IoT

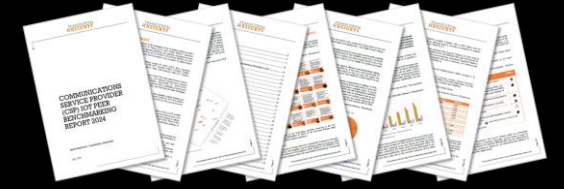
5G opportunities in IoT

Non-Terrestrial Networks
(NTNs) and hybrid
connectivity

Evolving mobile private
networks (MPNs)

Cellular LPWA

CSP IoT Peer Benchmarking 2024



Comparison of MNO/MVNO capabilities



Size of bubbles indicates approximate IoT connectivity and services revenue

Identification of key trends

<ul style="list-style-type: none"> If you're not quite rapidly evolving the proposition you're falling behind. New technologies arriving (SGP.32, NTN, RedCap). Enhanced analytics and data management. New commercial models and alliances. New approaches to customer support consulting, devices, multi-country connectivity. <p>Pace of change is rapid</p>	<ul style="list-style-type: none"> Evolution to a device-to-cloud approach. More consulting and enhanced pre-sales/post-sales support. More mobile and MVNO-like from the MNOs. More of a connectivity platform. <p>Evolving players</p>	<ul style="list-style-type: none"> We anticipate even more consolidation in the next 12 months. Actually relatively slow in last 12 months. Economics remain challenging for most (profitable companies are hard to find). MNO acquisition of MVNO is likely (as well as partnerships). <p>M&A</p>	<ul style="list-style-type: none"> Permanent roaming challenges generally being overcome but some still persist. Comparatively little that is demonstrable as an offering for addressing new regulatory issues, e.g. for national sovereignty. Still more opportunity for 'compliance-as-a-service'. <p>Compliance</p>	<ul style="list-style-type: none"> Very hard to compose services across multiple territories. Good work from some to ensure support for constrained techs. Some MNOs getting jittery about particularly NB-IoT. Volume of connectivity still dominated substantially by LTE. Increasing interest in Cat 1bis. <p>LTE-M/NB-IoT apathy</p>	<ul style="list-style-type: none"> Surge in interest in R17 NTN and LEOs. Positioned as a hybrid offering with satellite as fallback/overflow. Most are still exploring options, with DT and emnify leading the charge. Just about everyone partnering with Skylo (and Sateliot). <p>Hybrid cellular/satellite</p>
<ul style="list-style-type: none"> Refining 5G strategy, including for network slicing, QoS etc. but dependent on 5G SA. Challenges of roaming/consistency but potential for 5G overlay platform. MPN as testbed. Heavy of experimentation with RedCap but more hype than reality. <p>5G experimentation</p>	<ul style="list-style-type: none"> Everyone is doing it. MNOs (who might have been recent) are embracing. Not a magic wand for enterprises. Still needs management of profiles and back-end. Big driver for more inter-MNO collaboration (e.g. Verizon/Telenor/Bell Canada). <p>SGP.32 acceptance</p>	<ul style="list-style-type: none"> Lots of users of Aeris and Cisco exploring options for alternative CMNs. Diversification announcements imminent. Increasing interest in abstracting CMNs (e.g. using Simeric) to act as uber-platform to manage across multiple CMNs, e.g. DT IoT Hub, AT&T IoT Gateway Console. Compliance also a consideration. <p>CMN strategy evolution</p>	<ul style="list-style-type: none"> Recognition of need to manage device and connectivity in tandem. Lots of device management capability combining troubleshooting and removing swivel-chair. Often a constituent part of a more holistic set of middleware. Often major component of growing consulting focus. <p>Device/connectivity twin</p>	<ul style="list-style-type: none"> Specificity of device and connectivity to ensure performance, most obviously for constrained technologies. Telefonica's ThinThin idea, for instance includes optimisation of device and platform functionality to deliver better performance. Often major component of growing consulting focus. <p>Cross-optimisation</p>	<ul style="list-style-type: none"> Big push here. Adding gateways and modules to the proposition, along with associated consulting. Part of the device-to-cloud approach. Adding other sensor techs into gateway propositions. And presentation of sensor data. Practical support e.g. leasing, deployment services. <p>Hardware offerings</p>
<ul style="list-style-type: none"> Support for direct solutions waxes and wanes over the years. Tending to go towards offering more. Generally, we urge caution about going 'up the stack'. Lots that is essentially horizontal but with vertical contextualisation. Fleet, trackers, connected... <p>Vertical solutions</p>	<ul style="list-style-type: none"> Several MVNOs see this as a big opportunity (with much higher ASPU). Is IoT IT can be. Often as enterprise managed gateway (with deployment) targeted at particular verticals with deployment and managed sensors. <p>Fixed Wireless Access</p>	<ul style="list-style-type: none"> Some CSPs have extensive 5G capabilities. But the growth has been in lower-tier support for application development/deployment. With price erosion for connectivity more are focused on providing enhanced pre-sales/post-sales support for customer deployments. <p>Consulting focus</p>	<ul style="list-style-type: none"> Increasing focus from quite a few on their partner approaches for distribution (although already quite mature for some). Referral and reseller. Segmentation is key. Online channels still mostly just a lead gen. But good for demonstrating joined up fulfillment processes. <p>Channel refinement</p>	<ul style="list-style-type: none"> Minimum purchase requirements and/or revenue commitments. Greater certainty of revenue. Adding in changeable customer support tiers, consulting, VAS etc. Also, innovation in pricing models e.g. velled model. Plus, several MNOs helping customers to secure funding for IoT deployments. <p>Heading off price erosion</p>	<ul style="list-style-type: none"> Applicable to NB-IoT and LTE-M particularly, reflecting cost. Part of a continuum of mechanisms for reducing arbitrage opportunities. Create some challenges for pricing IoT solutions. Needs contextualisation of pricing. <p>Network attach fees</p>
<ul style="list-style-type: none"> More use of premium customer support mechanisms, white-glove services, VIP clients, platinum/gold/silver levels of support. Direct access to support for some customers. Continuing trend for customer success managers as internal advocates. <p>Service being and premium support</p>	<ul style="list-style-type: none"> Recent report highlights all the use of AI in CSP IoT operations. Mostly mundane, e.g. for admin tasks. Widely used for customer support. Some making use of AI for anomaly detection, network management and commercial planning purposes. <p>The use of AI</p>	<ul style="list-style-type: none"> Making horizontal services relevant for verticals. Modular and composable micro-services (including VAS, networks etc.) Contextualisation of all elements, including pricing requires more consulting type services. Sales messaging contextualised too. <p>Contextualised propositions</p>	<ul style="list-style-type: none"> 'Meet the developers where they are', abstracting network (NT) functionality for IT domain. Soracom's Polar/Dipper are good examples. Will be even more relevant for 5G. Interesting approach from INCE with developer certification and curated third party plugins. <p>Abstracting complexity for IT</p>	<ul style="list-style-type: none"> Linked to composable services, a set of VAS from partners. INCE plugin partners. Eseye app dev ecosystem, AT&T Control Center marketplace. Freemium model for some, e.g. Wireless Logic. <p>Application development ecosystem</p>	<ul style="list-style-type: none"> Orchestration of AI is a long-term goal. Short-term it's video. Verizon and AT&T particularly have launched video analytics functions. Low cost gateways supporting 3rd party video analytics services for numerous use cases. Various MPN offerings also feature this. <p>Video analytics</p>

Key themes (1/3)

- If you're not quite rapidly evolving the proposition you're falling behind.
- New technologies arriving (SGP.32, NTN, RedCap).
- New commercial models and alliances.
- New approaches to customer support, consulting, devices, multi-country connectivity.

Pace of change is rapid



- Evolution to a device-to-cloud approach.
- More consulting and enhanced pre-sales/post-sales support.
- Enhanced analytics and data management.
- More nimble and MVNO-like from the MNOs.
- More of a connectivity platform.

Evolving players



- We anticipate even more consolidation in the next 12 months.
- Actually relatively slow in last 12 months.
- Economics remain challenging for most (profitable companies are hard to find).
- MNO acquisition of MVNO is likely (as well as partnerships).

M&A



- Permanent roaming challenges generally being overcome but some still persist.
- Comparatively little that is demonstrable as an offering for addressing new regulatory issues, e.g. for national sovereignty.
- Still more opportunity for 'compliance-as-a-service'.

Compliance



- Very hard to compose services across multiple territories.
- Good work from some to ensure support for constrained techs.
- Some MNOs getting jittery about particularly NB-IoT.
- Volume of connectivity still dominated substantially by LTE.
- Increasing interest in Cat 1bis.

LTE-M/NB-IoT apathy



- Surge in interest in R17 NTN and LEOs.
- Positioned as a hybrid offering with satellite as fallback/overage.
- Most are still exploring options, with DT and omnify leading the charge.
- Just about everyone partnering with Skylo (and Sateliot).

Hybrid cellular/satellite



- Refining 5G strategy, including for network slicing, QoS etc. but dependent on 5G SA.
- Challenges of roaming/ consistency but potential for 5G overlay platform.
- MPN as testbed.
- Plenty of experimentation with RedCap but more hype than reality.

5G experimentation



- Everyone is doing it. MNOs (who might have been reticent) are embracing.
- Not a magic wand for enterprises. Still needs management of profiles and back-end.
- Big driver for more inter-MNO collaboration (e.g. Verizon/Telenor/Bell Canada).

SGP.32 acceptance



Key themes (2/3)

- Lots of users of Aeris and Cisco exploring options for alternative CMPs. Diversification announcements imminent.
- Increasing interest in abstracting CMPs (e.g. using Simetric) to act as uber-platform to manage across multiple CMPs, e.g. DT IoT Hub, AT&T IoT Gateway/Console.
- Compliance also a consideration.

CMP strategy evolution



- Recognition of need to manage device and connectivity in tandem.
- Lots of device management capability combining troubleshooting and removing swivel-chair.
- Often a constituent part of a more holistic set of middleware.

Device/ connectivity twin



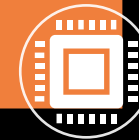
- Specifically of device and connectivity to ensure performance, most obviously for constrained technologies.
- Telefonica's TheThinX lab, for instance includes optimisation of device and platform functionality to deliver better performance.
- Often major component of growing consulting focus.

Cross-optimisation



- Big push here. Adding gateways and modules to the proposition, along with associated consulting.
- Part of the device-to-cloud approach.
- Adding other sensor techs into gateway propositions. And presentation of sensor data.
- Practical support e.g. leasing, deployment services.

Hardware offerings



- Support for direct solutions waxes and wanes over the years. Tending to go towards offering more.
- Generally, we urge caution about going 'up the stack'
- Lots that is essentially horizontal but with vertical contextualisation.
- Fleet, trackers, connected building all seem to have 'stuck'.

Vertical solutions



- Several MVNOs see this as a big opportunity (with much higher ARPU).
- Is it IoT? It can be.
- Often as enterprise managed gateway (with deployment) targeted at particular verticals with deployment and managed sensors.

Fixed Wireless Access



- Some CSPs have extensive SI capabilities. But the growth has been in lower-tier support for application development/ deployment.
- With price erosion for connectivity more are focused on providing enhanced pre-sales/post-sales support for customer deployments.

Consulting focus



- Increasing focus from quite a few on their partner approaches for distribution (although already quite mature for some). Referral and reseller.
- Segmentation is key.
- Online channels still mostly just a lead gen, But good for demonstrating joined up fulfilment processes.

Channel refinement



Key themes (3/3)

- Minimum purchase requirements and/or revenue commitments.
- Greater certainty of revenue.
- Adding in chargeable customer support tiers, consulting, VAS etc.
- Also, innovation in pricing models e.g. wallet model. Plus, several MNOs helping customers to secure funding for IoT deployments.

Heading off price erosion



- Applicable to NB-IoT and LTE-M particularly, reflecting cost.
- Part of a continuum of mechanisms for reducing arbitrage opportunities.
- Creates some challenges for pricing IoT solutions.
- Needs contextualisation of pricing.

Network attach fees



- More use of premium customer support mechanisms, white-glove services, VIP clients, platinum/gold/silver levels of support.
- Direct access to support for some customers.
- Continuing trend for customer success managers as internal advocates.

Service tiering and premium support



- Recent report highlights all the use of AI in CSP IoT operations.
- Mostly mundane, e.g. for admin tasks.
- Widely used for customer support.
- Some making use of AI for anomaly detection, network management and commercial planning purposes.

The use of AI



- Making horizontal services relevant for verticals.
- Modular and composable micro-services (including VAS, networks etc.)
- Contextualisation of all elements, including pricing requires more consulting type services.
- Sales messaging contextualised too.

Contextualised propositions



- 'Meet the developers where they are', abstracting network (OT) functionality for IT domain.
- Soracom's Polaris/Dipper are good examples.
- Will become even more relevant for 5G.
- Interesting approach from 1NCE with developer certification and curated third party plugins.

Abstracting complexity for IT



- Linked to composable services, a set of VAS from partners.
- 1NCE plugin partners, Eseye app dev ecosystem, AT&T Control Center marketplace.
- Freemium model for some, e.g. Wireless Logic.

Application development ecosystem



- Orchestration of AI is a long-term goal. Short-term it's video.
- Verizon and AT&T particularly have launched video analytics functions. Low cost gateways supporting 3rd party video analytics services for numerous use cases.
- Various MPN offerings also feature this.

Video analytics

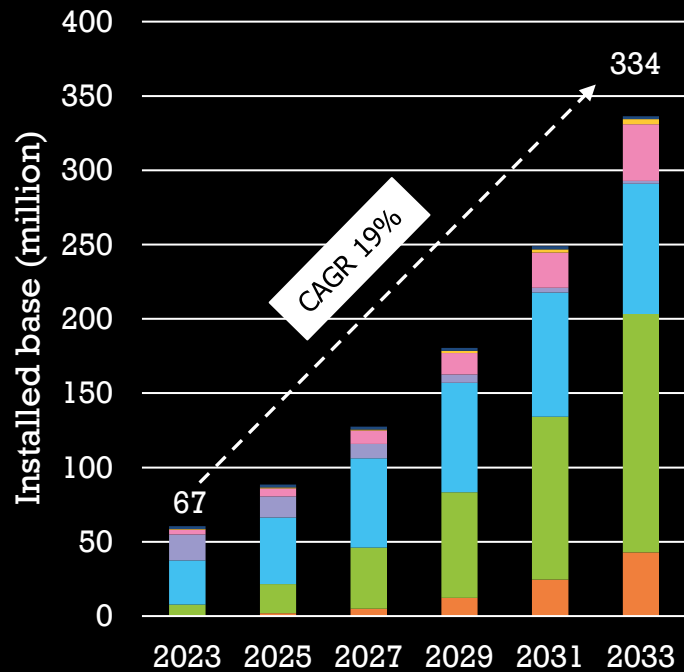


Forecasts

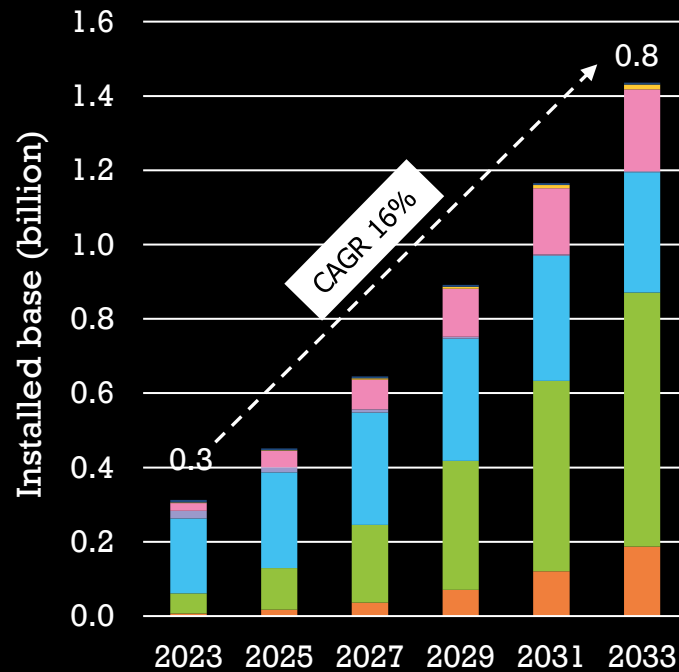
IoT public network connections forecast, 2023-33, by technology

[Source: Transforma Insights IoT Forecast Database, 2024]

Latin America



North America



Technology	CAGR 2023-33		Leading applications
	Latam	N Am	
Satellite	27%	26%	Track & Trace, Container Tracking, Drones, Military, Assisted Living People Tracking
Other	0%	-3%	Smart Meters, Public Space Lighting, Crop Management, Connected Glasses, Fire Alarms
LPWA (non-mMTC)	28%	26%	Smart Meters, White Goods, Crop Management, Public Space Lighting, Track & Trace
2G/3G	-19%	-22%	Smart Meters, Emergency Call, Smart Grid, EV Charging, Track & Trace
4G	11%	5%	Vehicle Head Unit, Electricity Smart Meters, Road Fleet Management, Smart Watches, CCTV
5G mMTC	36%	29%	Track & Trace, Smart Meters, White Goods, Fire & Security Alarms, Stock Level Monitoring
5G non-mMTC	55%	39%	Vehicle Head Unit, Smart Watches, CCTV, Road Fleet Management, E-Bikes

The Transforma Insights IoT Forecast is based on a comprehensive analysis of 243 applications spanning the entirety of the IoT market opportunity. Forecasts cover 196 countries, with metrics including connected devices, annual shipments, RGUs, technology split, public vs private network split, vertical sector, and revenue (hardware, connectivity and services) all accessible via the online [Transforma Insights Forecast Database](#). All connections are counted based on their highest embedded technology. Cellular (5G mMTC) includes NB-IoT, LTE-M and subsequent future evolutions. LPWA (non-mMTC) includes LoRaWAN, Sigfox and other unlicensed technologies. Short Range includes Bluetooth, WiFi, Zigbee and other similar technologies.

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Thank you



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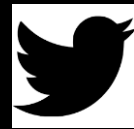
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