tunein

5G and smart cities

Concert

How can 5G help harness the data explosion?

Organisations today are confronted by exponential amounts of data, in many different formats and from a variety of sources. This data growth is showing no signs of slowing, with one International Data Corporation (IDC) study estimating that the amount of data created, captured, and replicated across the world could grow from 33 Zettabytes (ZB) in 2018 to 175 ZB by 2025.

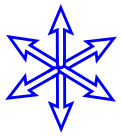
Most of this can be characterised as unstructured data such as email, video, audio and social media messages. However, unlocking the value of data (and how to analyse and use it) is also at the heart of digital transformation, with organisations looking to unlock its value and transform it into significant business insight, competitive advantage and revenue generating opportunities.

33 ZB by 2018

175 ZB by 2025

IDC says that while the enterprise will represent more than 80% of total installed bytes worldwide by 2025, healthcare is primed to grow the fastest, reflecting advancements in healthcare analytics and imaging technology, as well as the increasing amount of real-time data created in medical care.

Across the other sectors such as media, entertainment and financial services, the increasing adoption of edge computing, with opportunity for blockchain, analytics and artificial intelligence (AI) are all fuelling the growth of data.



Hyperscale

Hyperscale datacentres will represent **53%** of all installed datacentre servers by 2021, with traffic set to quadruple

Big data

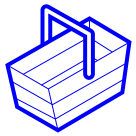
Big data alone will represent **30%** of data stored in datacentres by 2021, up from **18%** in 2016

IoT

Driven by IoT, the total amount of data centres created by any device will reach **847ZB** per year by 2021, up from **218ZB** per year in 2016

Applications

Within the enterprise segment, database/ analytics and **IoT** will be the fastest growing applications



Consumer

Within the consumer segment, social networking and video streaming will be the **FASTEST** growing applications

Is 5G a data saviour?

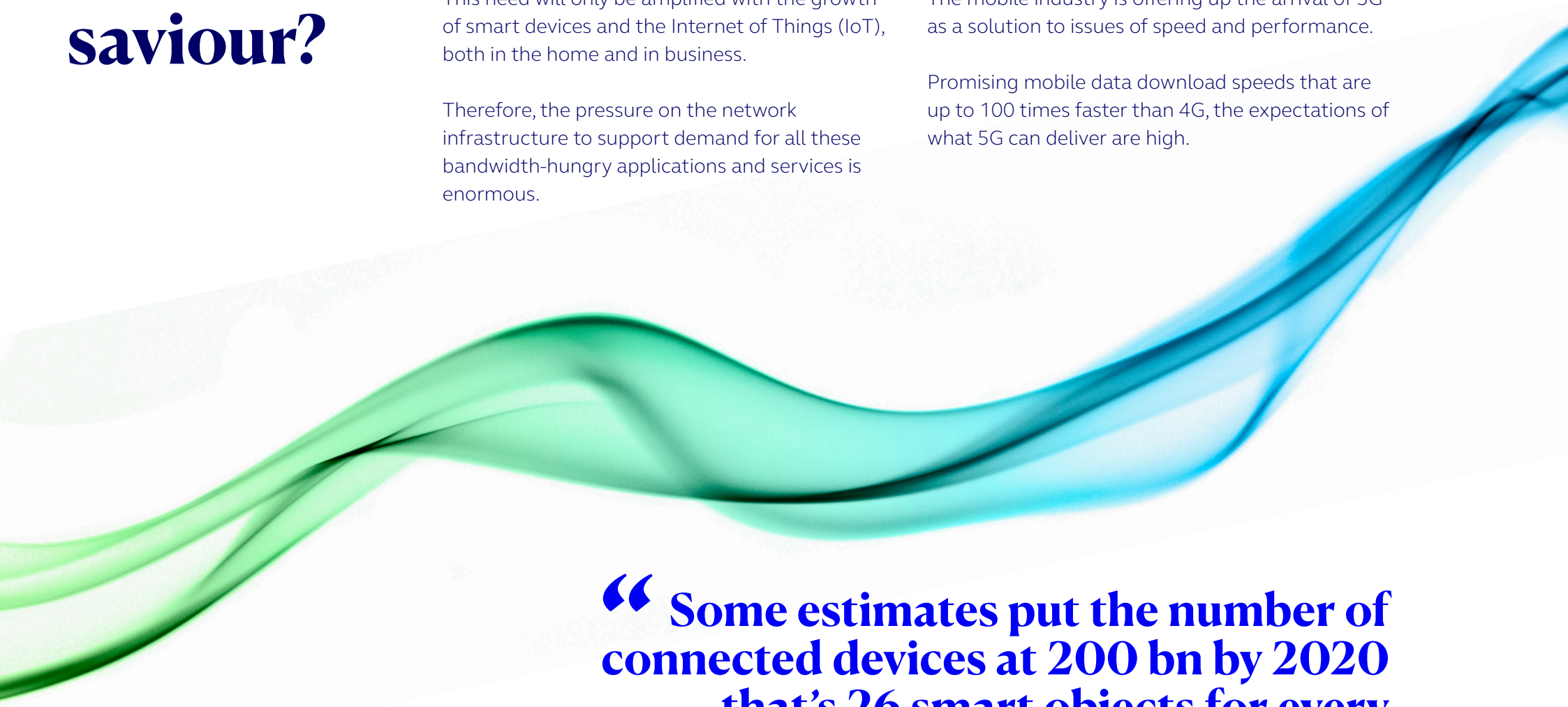
Away from the business world, consumers' dependency on data is evident in their expectation of 'always-on' access to high-quality data services, regardless of device or location.

This need will only be amplified with the growth of smart devices and the Internet of Things (IoT), both in the home and in business.

Therefore, the pressure on the network infrastructure to support demand for all these bandwidth-hungry applications and services is enormous.

The mobile industry is offering up the arrival of 5G as a solution to issues of speed and performance.

Promising mobile data download speeds that are up to 100 times faster than 4G, the expectations of what 5G can deliver are high.



"Some estimates put the number of connected devices at 200 bn by 2020 – that's 26 smart objects for every human on earth."

2019 The Year of 5G

With mobile operators currently undertaking 5G testing and pilot projects, 2019 is set to be a seminal year in the mobile industry. 5G handsets are predicted to hit the market and end-users will start to experience the technology first-hand. UK mobile operator EE has announced six cities:

These will be the first to get 5G mobile networks, by mid-2019. By the end of the year another 10 cities will get EE networks which could transmit data at speeds faster than gigabits per second. The other UK networks are also currently trialling 5G to accelerate their rollout this year.

London

Cardiff

Edinburgh

Belfast

Birmingham

Manchester

UK government's 5G pledge

The UK Government says it wants to connect 15m premises to full fibre broadband by 2025 and provide coverage across all of the UK by 2033, which it says is vital to underpin 5G coverage.

The Government says it will ensure that Spectrum is allocated in a way that supports its mobile ambitions and look at the regulatory framework to make sure it supports investment in 5G infrastructure and services.

It also says it will set up "a cross-government barrier busting task force" to address specific challenges in the deployment of telecoms infrastructure, and work with local government to make sites available for the deployment of infrastructure and to deliver the levels of connectivity that local areas need.

15 million premises to connect to full fibre broadband by 2025

Separating hype from reality

Globally, the rivalry between operators – and even governments – in the race to roll out 5G is intense, with the United States' National Security Council even admitting that "Whoever leads in technology and market share for 5G deployment will have a tremendous advantage towards… commanding the heights of the information domain."

Analyst Mintel claims that the deployment of 5G will drive heightened promotional activity with greater urgency for providers to differentiate with strong brand messaging, better experiences, and re-imagined bundles to their customers. As such, the hype around the technology is building. However, it is important to acknowledge the practical limitations associated with introducing what is considered a game-changing technology, says Rennie Dalrymple, Managing Partner at Concert.

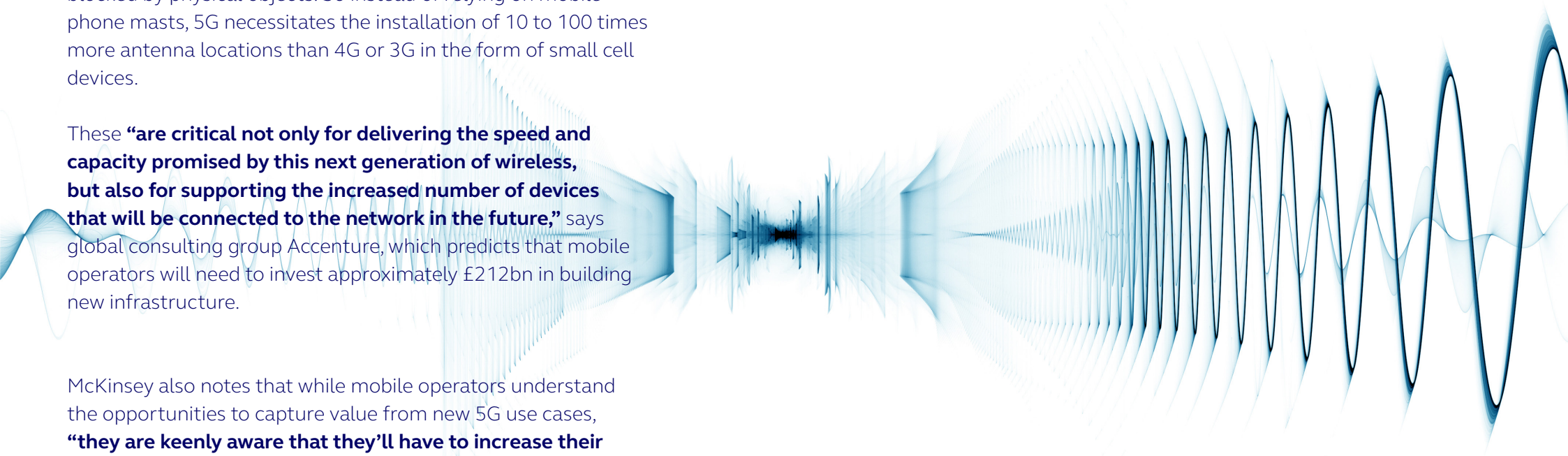
"From an investment standpoint alone, the leap from 4G to 5G is much greater than the upgrade from 3G to 4G, which involved modernising infrastructure that already existed," he says.

For example, 5G's shorter wavelengths mean that signals will not be able to cover long distances and will be more easily blocked by physical objects. So instead of relying on mobile phone masts, 5G necessitates the installation of 10 to 100 times more antenna locations than 4G or 3G in the form of small cell devices.

These **"are critical not only for delivering the speed and capacity promised by this next generation of wireless, but also for supporting the increased number of devices that will be connected to the network in the future,"** says global consulting group Accenture, which predicts that mobile operators will need to invest approximately £212bn in building new infrastructure.

McKinsey also notes that while mobile operators understand the opportunities to capture value from new 5G use cases, **"they are keenly aware that they'll have to increase their infrastructure investments in this technology."**

"Operators will still have to upgrade their 4G networks to cope with growing demand…we predicted that network-related capital expenditures would have to increase 60% from 2020 through 2025, roughly doubling total cost of ownership (TCO) during that period," McKinsey says.



"Whoever leads in technology and market share for 5G deployment will have a tremendous advantage towards… commanding the heights of the information domain."

The smart building opportunity

The combination of 5G and IoT is generating many smart city potential applications – everything from monitoring air quality, energy use and traffic patterns to smart parking, crowd management, and emergency response.

Some estimates say 5G will help to generate £95bn in benefits and savings through reductions in energy usage, traffic congestion and fuel costs.

“Smart buildings are becoming a more significant part of project conversations,” says Dalrymple. “Our clients are looking at their digital strategy – for example, intelligent lighting systems that operate over a wireless network to provide energy savings based on occupancy as well as many other factors. These can equate to significant operational cost savings.”

There are also other applications potentially enabled by 5G, he says, around security, heating, air conditioning and facilities management that can make systems more efficient, staff more productive and require fewer people to run a building or property portfolio.

“As a profession we need to provide the right consultancy advice to our clients about the opportunities from a cost point of view, as well as the operational impact,” says Dalrymple.

This digital-driven approach can also make the role of PM and QS more efficient and transparent in how we deliver services through connecting systems with applications, and other team members and partners.

Evolution not revolution

While 5G will no doubt enable a range of new and transformative applications in the future, it is important to distinguish between the excitement that often comes with any new technology and its practical application.

Says IDC analyst Jason Leigh: “mobile network operators should focus on managing expectations and crafting a narrative that reconciles the hype and potential of 5G with the value and realities of the consumer experience today.”

Long-term, analysts expect 5G network infrastructure revenue to reach $26bn in 2022 as network build-outs progress and 5G-enabled solutions gain traction.

However, says Dalrymple: “The introduction of 5G services is likely to resemble an evolution rather than a revolution. In some instances, operators are still investing in enhancing their 4G networks, which can cater for many of the applications users are demanding today.” Importantly wireless operators need to develop sound business cases that support increased revenue growth from 5G to match the lend of investment required to deliver their services.

He notes that low spectrum is still coming to auction, which will be primarily used for increasing 4G traffic over the short term. “Certainly, in the UK, current 5G trials build on infrastructure that is already in place, rather than starting from scratch, and it is likely we’ll see a hybrid rollout of ‘5G-lite’ services,” he notes.

This is echoed by McKinsey: “Many elements of current 5G technology build on 4G networks, rather than representing a complete departure – and that means mobile operators can take an evolutionary approach to infrastructure investment.”

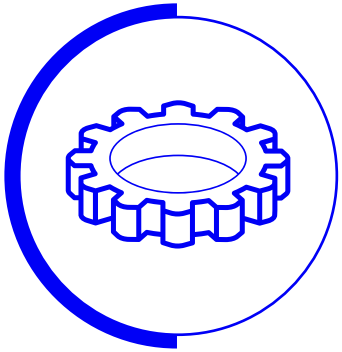
The firm advises that operators can delay their investments in 5G by upgrading the capacity of their existing 4G macro network by re-farming a portion of their 2G and 3G spectrum, or by acquiring additional spectrum when available.

This way, they can evolve to LTE-and LTE-Pro features, such as 4x4 or massive MIMO (a multiple input, multiple output technology). "This evolutionary approach will be the natural path for most operators, allowing them to minimise investments while the incremental revenue potential of 5G remains uncertain," it says.

Dalrymple believes that while data continues to be the main driver for 5G services, he advocates for a pragmatic approach to 5G deployment: "It's still early days, and it will be incremental steps forward rather than a huge 5G revolution," he believes.

"Many elements of current 5G technology build on 4G networks, rather than representing a complete departure – and that means mobile operators can take an evolutionary approach to infrastructure investment."

Top 5

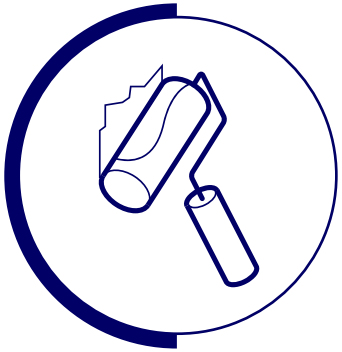


#1

Will private networks take the lead due to public network coverage taking too long?

#2

How much light can be shed on Dark Fibre?



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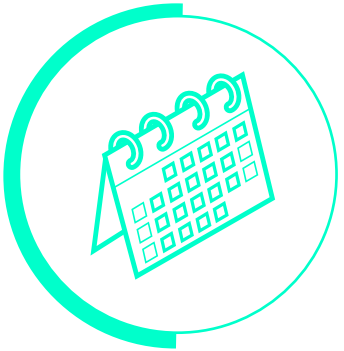
Reality of local authority's collaboration?

#4

10G - dream or nightmare?



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Who's keeping an eye on the development of relevant technology?

Glossary

1G: The first generation of mobile network technology, offering analog-based voice services.

2G: The second generation of mobile network technology, offering digital voice and low-speed data services.

3G: The third generation of cellular network technology, offering broadband data services.

4G: The fourth generation of cellular network technology, offering high-definition digital voice. It also offers a greater data performance speed than 3G.

5G: 5G is, you've guessed it, the fifth generation of cellular network technology. It's expected to overtake 4G access speeds, latency, number of connected devices to coverage, availability, and energy consumption.

C-RAN: (the 'C' in which stands for both 'Centralized' Radio Access Network and 'Cloud-Based' Radio Access Network) is a cloud-computing based architecture for radio access networks. It supports all of the aforementioned wireless communication standards: 2G, 3G, 4G and 5G. It improves cell coordination, scheduling, resource pooling, and load balancing.

Cloud Computing: or 'The Cloud' as it's commonly referred to, is the practice of employing a network of remote servers hosted on the Internet. It allows you to store, manage and process data, as opposed to using a computer or local server.

Densification: Network densification refers to the practice of adding more cell sites to increase the amount of available capacity. They can be placed in capacity-strained areas to bolster capacity where it is most required, and also aid in offloading traffic from surrounding sites.

Edge Computing: Allows analytics and data gathering to occur at the source of the data by pushing computing applications, data and services away from centralized nodes to the edge of a network, closer to the end-users.

Fixed Line: A fixed-line network refers to wired networks using cables laid across land, as opposed to wireless transmission technologies.

IoT (Internet of Things): Connecting objects, appliances and machinery via embedded sensors and chips, enabling them to interact, operate and receive and transmit data automatically.

Latency: The amount of delay, or lag in response, in a network. One of 5G's main advantages, along with faster speeds once a response has started.

Spectrum: The frequency of airwaves used to carry, among other things, cell phone signals. 5G uses a wide swath of airwaves, including higher frequencies than have been used in the past.

Millimeter Wave: This ultra-high-frequency spectrum is key getting the fastest speeds out of 5G. These signals are also fragile, traveling comparatively small distances and easily blocked by buildings and other objects.

Small Cells: As the name implies, these devices for providing network service are smaller than a traditional cell tower but as a result have to be placed much more closely to one another. Critical to 5G, carriers have also been using small cells to improve their 4G LTE coverage and capacity in cities.

LTE Network (Long-Term Evolution): LTE is a 4G wireless communications standard developed by the 3rd Generation Partnership Project (3GPP) that's designed to provide up to 10x the speeds of 3G networks for mobile devices such as smartphones, tablets, netbooks, notebooks and wireless hotspots.

Massive MIMO: Massive multiple-input, multiple-output, or massive MIMO, is an extension of MIMO, which essentially groups together antennas at the transmitter and receiver to provide better throughput and better spectrum efficiency.

Big Data: Extremely large data sets that may be analysed computationally to reveal patterns, trends, and associations, especially relating to human behaviour and interactions.

Smart Building: Any structure that uses automated processes to automatically control the building's operations including heating, ventilation, air conditioning, lighting, security and other systems.… But newer buildings, or older structures that have been converted to smart buildings, are constantly changing.

Smart City: A high-tech intensive and advanced city that connects people, information and city elements using new technologies in order to create a. sustainable, greener city, competitive and innovative commerce, and an. increased life quality.

Contributor

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Journalist

A specialist in the IT channel with over 20 years' experience, Christine writes about a broad range of tech from a business perspective, including cloud, cybersecurity, collaboration and emerging trends.

Christine writes editorial news and features, as well as case studies, blogs, whitepapers and by-line articles

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