Canonical

BT Group brings 5G to the UK with the power of open source infrastructure

About BT Group

- World-leading communication services company and largest telco in the UK
- BT Group's mobile network, EE, has been named UK's Best Mobile Network for more than 10 years in a row
- Consistently expanding in size, EE now delivers 5G to over 75% of the UK population *(Correct as of May 2024)*

Highlights

- BT Group has built its 5G mobile network with Canonical's infrastructure solutions
- With network functions virtualised on Canonical OpenStack, the company can now build new services in weeks and deploy in days
- The 5G network enables seamless mobile connectivity even in high density venues like sports stadiums

BT Group

The future of mobile network infrastructure is open source.

BT Group stands at the forefront of the UK's march towards ubiquitous 5G coverage. To deliver this new generation of mobile network, the company needed a new kind of infrastructure that could support 5G's distributed architecture and enable network function virtualisation. Looking for the best balance of cost, support and control, BT Group decided to build its new mobile network using Canonical's open source infrastructure solutions. With a network based on Canonical OpenStack, BT Group has now successfully rolled out 5G access to over 75% of the UK population, as well as recently winning the UK's Best Mobile Network for the 21st consecutive time based on independent testing from RootMetrics – a time period spanning more than ten years.

Challenge

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As the company behind EE, one of the UK's largest mobile networks, BT Group plays a critical role in the country's national infrastructure. Underpinning connectivity for both work and daily life, reliability and performance of the network are paramount. Users' expectations of their mobile networks are only increasing, so to stay ahead of demand and continue delivering the country's leading service, BT Group began rolling out its 5G Core network in 2019.

5G represents a step forward compared to previous generations of mobile networks, not only in its capabilities, but also in its requirements. In contrast to the hierarchical and centralised architectures of traditional networks, 5G relies on a distributed and service-based architecture (SBA). This approach, decoupling network functions into smaller services, makes for a faster and more resilient network – but it requires entirely new infrastructure.

Gary Roberts, Director, Network Cloud at BT Group, takes up the story: "The challenge was how to bring real network function virtualisation onto a common platform. Before this, any forays into virtualisation had been on a bespoke basis. At the same time, we didn't want to be beholden to proprietary solutions. We wanted to move into a more open source world for the support, community and price".

These criteria naturally led BT Group to OpenStack, the world's leading open source cloud computing platform. Virtualising network functions on OpenStack would enable BT Group to turn its 5G network components into software applications and separate them from the underlying hardware. This would make it possible for multiple applications to share the same hardware across data centres, and it would empower BT Group to update its software without replacing physical equipment. The results: continuous integration and development, faster software updates, and significantly enhanced network scalability.

However, this project represented one of BT Group's first major steps in its open source journey. OpenStack is far from a simple platform, so given the scale and critical importance of the 5G Core, the company wanted the help of an expert in open source.

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Solution

BT Group began looking for a partner to help design, deploy and support its OpenStack infrastructure. With 20 years of open source experience and a wealth of OpenStack deployments under its belt, Canonical was the ideal candidate.

With Canonical’s help, BT Group built multiple clouds to support the 5G control and data plane use cases, together with their associated network management requirements. These clouds are based on Canonical’s telco-grade OpenStack distribution, which minimises the cost and complexity of OpenStack operations through advanced automation.

In the past, BT Group had often relied on vendors to manage its infrastructure. One of the motivations for embracing open source was to take full control of the ecosystem internally. To that end, Canonical provided extensive training to upskill BT Group’s team with all the expertise they needed to operate OpenStack at the highest level.

Nick Heatley, Network Architect at BT Group, adds “Open technologies have allowed us to use common tooling to automate the layers, and open, standard observability is a game-changer for Operations in terms of full-stack visibility”.

A project of this scale will always have its challenges, but the BT Group and Canonical teams developed a strong partnership and worked together to successfully overcome every complication.

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Results

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With Canonical's infrastructure solutions at the heart of the new mobile network, BT Group and EE have successfully made 5G available to over 75% of the UK population and counting.

Gary Roberts explains: "In the last year, we've moved the entire mobile base for EE onto this infrastructure. So if you're on EE, you're on Canonical".

The move to 5G Core has unlocked an unprecedented degree of agility, as the distributed architecture and virtualised network functions are enabling BT Group to update its software and scale the network at will. The company can develop new services in a matter of weeks, and deploy in days.

"Transitioning to the new infrastructure isn't just replacing like for like", adds Gary Roberts. "We've leapfrogged our capabilities and scope. We've replaced our traditional infrastructure with a network cloud that's now being used by many other tenants".

With this project, Gary and his team have blazed a trail for open source at BT Group, and open source technology is quickly gaining credibility and traction with the business. As people have seen the capabilities of 5G Core, and the speed and reliability that Canonical's solutions bring to product development, many teams from the wider BT Group organisation have asked to use the OpenStack platform. The company is moving towards a converged technology strategy whereby application teams can take advantage of the centrally-managed OpenStack cloud and focus on their applications, rather than maintaining their own infrastructure.

However, the most profound impact of the 5G project has been on customers themselves. For example, one of the key strengths of 5G is in boosting mobile capacity, ensuring consistent service quality even in high density areas. Historically, mobile networks have always struggled at sports stadiums and similar venues, but with 5G and dedicated on-site network boosting systems, BT Group can deliver seamless connectivity to tens of thousands of people in the same location simultaneously.

Working alongside BT Group and Canonical, Watford Football Club recently became one of the first stadiums to bring the power of 5G to its fans. John Parslow, a lifelong Watford supporter, shares his experience: “For as long as I can remember, it was always impossible to upload and share videos from the stadium. But now, they’ve introduced 5G and it is allowing me to connect with my fan group around the world as if they were in the stadium with us”.

With such a major paradigm shift, it would be unsurprising if BT Group saw some short-term disruption or degradation to the performance of its mobile network. But that has not been the case. On the contrary, performance has only gotten better – and in 2023, after the move to 5G Core, EE was named UK’s Best Mobile Network for a record-breaking tenth consecutive year.

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