

# UK AltNets Rapidly Build and Scale ISP Operations with netElastic and Intel



## Results at a glance:

- **100x throughput** gain from lab deployment to actual ISP environment
- Increased **scalability** to rapidly add capacity to meet **subscriber growth**
- Improved **subscriber management** capabilities
- Optimized **traffic hashing** across multiple queues and CPU cores
- Minimized **CAPEX and OPEX** by avoiding overprovisioning and vendor lock-in
- Greater **network resilience** and **failover capabilities**

## Executive Summary

Expanding the availability of fiber broadband access is a major initiative in the United Kingdom. Driven largely by independent alternative network providers (AltNets), this expansion is rapidly making fiber broadband available across the entire country. However, as AltNets grow, many are encountering technical challenges and high costs related to proprietary networking hardware.

By adopting netElastic's virtual broadband network gateway (vBNG) solution powered by Intel® technologies, fast-growing UK AltNets, such as Orbital Net and F&W Networks overcame IPv4 address exhaustion, optimized traffic handling, and efficiently scaled their broadband capabilities. The software-based solution provides the flexibility to grow cost-effectively while achieving high network performance—enabling the ISPs to steadily scale and meet increasing subscriber demand.

## Challenge: High costs and performance limitations of proprietary networking solutions

F&W Networks is an alternative network provider (AltNet) that delivers full fiber, gigabit-speed broadband to over 30 towns in South England. Partnering with ten ISPs, one of which has recently celebrated its 30,000th customer, F&W Networks has experienced tremendous growth as it connects homes, businesses, schools, and community hubs across the UK to its ultra-fast broadband services.

Orbital Net is a one-stop communications provider delivering connectivity solutions to small, medium, and large multi-site businesses, schools, and other organizations. It has been operating for 25 years. Leveraging fiber to the home (FTTH) and WiMAX technologies, Orbital Net is known for its community service and ability to find solutions to local connectivity challenges.

Like many AltNet ISPs in the UK, Orbital Net and F&W Networks needed solutions to manage subscribers, address IP address exhaustion, and increase bandwidth capacity for its rapidly growing network.

“netElastic has proven to be a valuable partner. Their focus on ease of collaboration stands out, making complex deployments feel simple and efficient.”

– Oriol Riba, CTO, F&W Networks

## IP address exhaustion

Despite being introduced in the 1980s, Internet Protocol version 4 (IPv4) stubbornly remains the dominant industry standard for internet addressing. The persistence of the IPv4 standard presents some drawbacks for modern ISPs.

Andrew Cassidy, head of infrastructure at Orbital Net explained that IPv4 addresses are exhausted, expensive, and difficult to acquire. “We deal with that using carrier-grade network address translation (CGNAT), a technology that allows us to use one IP address for many customers and efficiently handle IPv4 address exhaustion,” he said.

## Need for traffic optimization

Orbital Net and F&W Networks also wanted to optimize traffic handling and distribution for protocols such as Point-to-Point Protocol over Ethernet (PPPoE), L2TP LAC/LNS, and QinQ.

In addition, the high cost and limited scalability of legacy broadband vendors’ network hardware make it difficult for ISPs like Orbital Net and F&W Networks to launch and scale their operations cost effectively.

The ISP wanted a software-based broadband networking solution from an open technology ecosystem that allows it to overcome technical challenges while flexibly scaling out its businesses as it grows.

Oriol Riba, CTO of F&W Networks, has faced these challenges successfully: “With netElastic, we’ve seen a noticeable improvement in network scalability. Their technology has allowed us to handle growing traffic demands with ease and efficiency,” he said.

## Solution: Software-based, Intel-powered vBNGs

While Orbital Net had evaluated connectivity platforms from established vendors, its team was impressed by the performance and capabilities of netElastic’s vBNGs. What’s more, the AltNet also found that netElastic’s flexible sales model was ideally suited for its ISP growth strategy. Moreover, netElastic offers a “pay-as-you-grow” model that lets customers deploy and provision hardware incrementally to match their demand.

The software-based vBNG solution from netElastic uses standard Intel® CPUs and Intel® Ethernet Network Adapters rather than expensive proprietary hardware from legacy vendors.

This flexibility enabled Orbital Net and F&W Networks to minimize hardware spending for its initial rollout and to seamlessly add capacity as subscriber demand grows.

“With traditional, proprietary network hardware providers, customers have to commit to a very large platform,” explained David Williams, senior vice president of sales and marketing at netElastic. “There’s no option to buy half or a quarter of a box of our well-known competitor’s networking equipment. With a netElastic Intel-based solution, ISPs can right-size it to their needs and put it out into the network wherever they want. Then, over time, they can flexibly grow and scale their throughput and subscriber management capabilities as needed.”

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## Intel Dynamic Device Personalization (DDP) and Data Plane Development Kit (DPDK) optimize network traffic

Since its platform is software-based, netElastic vBNGs can leverage three key Intel technologies to address the limitations of CGNAT and optimize network performance: the Data Plane Development Kit (DPDK), Dynamic Device Personalization (DDP), and Intel® Speed Select Technology (Intel® SST).

Traditionally, data packet processing is done via the operating system's kernel, which can become a bottleneck that limits throughput and causes latency. DPDK is a set of software libraries and drivers that allows network traffic to bypass the kernel for faster and more efficient traffic handling. Plus, DPDK takes advantage of multicore CPUs, such as Intel® Xeon® processors, and Intel® Ethernet E810 NICs, by splitting packet traffic into multiple queues that can be distributed across different cores for processing.

A common netElastic vBNG platform consists of a pair of Intel® Xeon® Gold 6330N processor-based servers in active/active redundancy mode and multiple 100 GbE Intel® Ethernet E810 Network Adapters that support high-performance routing using DPDK and DDP.

DDP provides advanced capabilities, including the ability to customize traffic handling and distribution with Intel Ethernet Network Adapters. For example, DDP can help optimize PPPoE packet traffic across multiple CPU cores, ensuring that no single core is overloaded.

In addition, Intel SST provides more granular control over processor performance to optimize total cost of ownership. Intel® SST-CP Technology maintains a higher base frequency on a subset of processor cores and a lower base frequency on the remaining processor core, a valuable tool for balancing performance and power efficiency.

"Proprietary network adapter vendors can't do many of the things that Intel has enabled with DDP for subscriber connection types and certain protocols on the network, like QinQ, L2TP, and PPPoE, that are very important to internet service providers," said Williams.

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## Partners in success

Close collaboration between netElastic and Intel was crucial for the success of this deployment.

"As our AltNet customers started to expand traffic and user count, we noticed some scaling limitations within our software deployment. We engaged the Intel technical team and identified that those issues were addressed in a newer version of DPDK. That immediately went into our development cycle to update the underlying platform—which is not a small undertaking," Williams said. "It was very important to have a relationship with Intel and collaborate to get a solution in a timely manner. We're talking around six weeks. With other network solution vendors, it could be years before a solution is developed for a single customer issue. We were able to get to a solution, implement it, test it, get it fully baked, and out into a customer's hands in a very short time."

## Results: A high-performance and highly scalable ISP platform, powered by Intel Ethernet Technology

Working with netElastic, Orbital Net rapidly progressed from a few gigabits of throughput in lab testing to 100-gigabit capabilities with its production deployment. Now, Orbital Net has scaled up to multiple 100 GbE platforms in its network—a 100x increase from the initial lab tests.

A common netElastic vBNG platform consists of a pair of Intel® Xeon® Gold 6330N processor-based servers in active/active redundancy mode and multiple 100 GbE Intel® Ethernet E810 Network Adapters that support high-performance routing using DPDK and DDP. The platform accommodates growing subscriber demand and gives AltNet providers greater resilience and failover capabilities. Over time, netElastic will continue to evolve its offering in line with Intel® technology

developments, and is considering upgrading to the upcoming 200GbE Intel® Ethernet E830 Network Adapters.

With standard ISP operations up and running, Orbital Net is expanding its use of netElastic’s capabilities, including support for IPv6. “We’ve started enabling CGNAT and IPv6 recently with minimal issues”, Cassidy continued. “Most importantly, it’s significantly more reliable than our previous platform and we’re running into fewer issues in general across the board and an overall reduced administrative load.”

“For me, it’s really about the capabilities we need, the scalability and commercial support from netElastic, and the Intel ecosystem beneath it all,” Cassidy concluded.

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– Andrew Cassidy,  
head of infrastructure, Orbital Net

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