Validating Scalable Server Energy Optimisation in Real-World Data Centre Conditions

Transforming server estates with dependable, at-scale optimisation that reduces energy, emissions, and cost.

Qnetix Report
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Executive Summary

This white paper presents the technical validation of ServerOptix when deployed at scale across a production server estate.

The primary objective was to confirm - through empirical baseline telemetry and independent rack-level PDU metering - that ServerOptix is reliable and operates as intended under real workloads at multi-rack scale, with zero or near-zero impact on server performance.

A 17-hour baseline telemetry window across 50 hosts established a consistent pre-optimisation profile, enabling comparison with measurements taken during the optimisation window.

Over the following two weeks, rack-level metering recorded a sustained 3.1kW reduction across 50 servers, corresponding to a normalised reduction of ~62W per server (~35%).

While energy savings are reported, they are considered secondary; the main purpose of this work is to validate the technical behaviour and consistency of both ServerOptix and the servers it is deployed on at scale.

Background

Data centres face accelerating computational demand, increasing energy intensity, and growing pressure to validate technologies that can optimise server behaviour without affecting service stability.

Before adopting optimisation solutions at scale, operators require evidence-backed technical validation built on structured baselines, consistent measurement techniques, and real-world operating conditions.

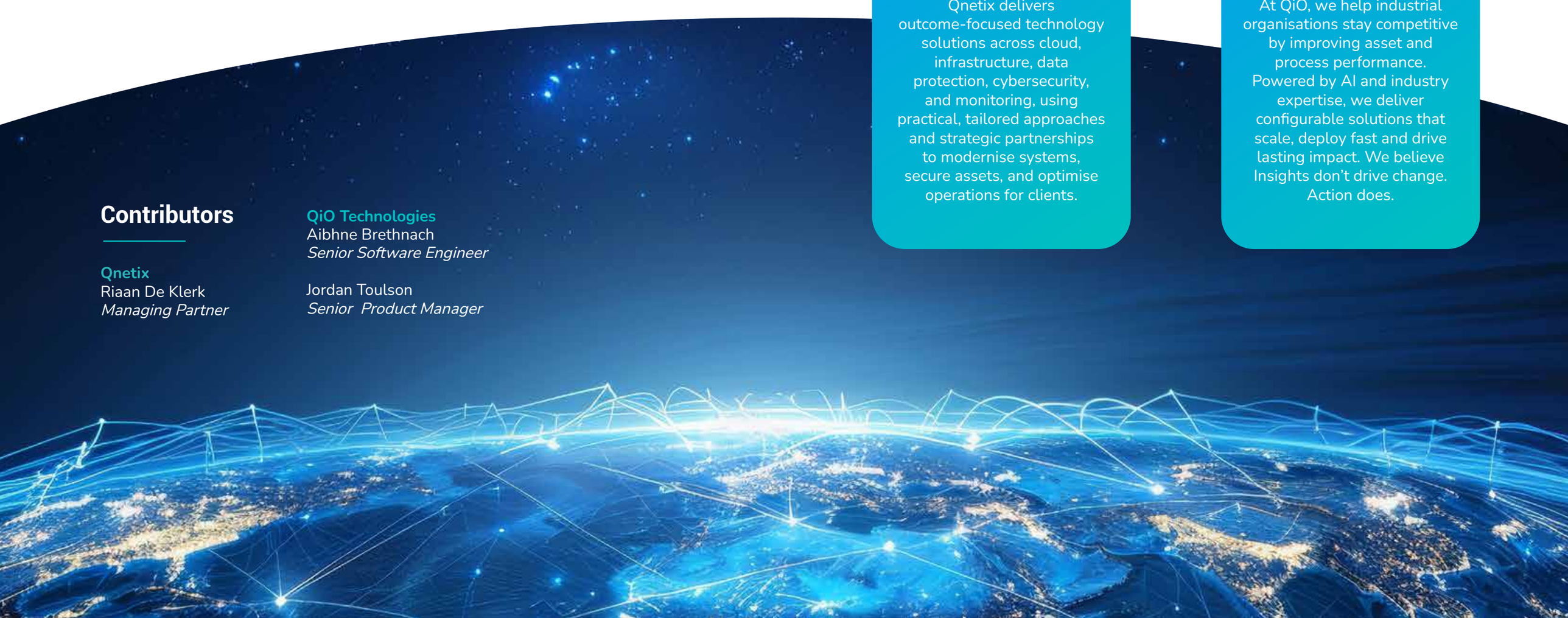
This white paper therefore focuses on validating the technical behaviour of ServerOptix when applied to a large, operational server population, as well as the resulting energy savings.

Qnetix

Qnetix delivers outcome-focused technology solutions across cloud, infrastructure, data protection, cybersecurity, and monitoring, using practical, tailored approaches and strategic partnerships to modernise systems, secure assets, and optimise operations for clients.

QiO

At QiO, we help industrial organisations stay competitive by improving asset and process performance. Powered by AI and industry expertise, we deliver configurable solutions that scale, deploy fast and drive lasting impact. We believe Insights don't drive change. Action does.



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Technical Objectives

- Validate the optimisation behaviour of ServerOptix when deployed at multi-rack scale.
- Establish a robust, repeatable baseline of server power consumption across a large server estate.
- Measure power behaviour during the optimisation window using independent rack-level PDU metering.
- Maintain consistent workloads to identify any change in server performance during the optimisation window.
- Confirm that observed reductions are consistent, empirically grounded, and attributable to optimisation behaviour.
- Normalise observed reductions across participating servers to support comparability and repeatability.

Methodology

Test Environment

Testing was conducted on a Qnetix production environment. 50 servers of varying models and specifications were identified as the target hosts for the exercise.

These servers host Qnetix internal applications and services; workloads, SLAs, and operational policies were not modified for the purposes of this testing and continued ‘as normal’ throughout the testing window.

Figure 1: One of two target racks

Test Environment Hardware Summary

The validation used Dell PowerEdge servers. These systems included both AMD EPYC–based and Intel Xeon–based models, providing a mix of CPU generations, socket counts and configurations.

This enables verification that any optimisation provided by ServerOptix is not reliant on the use of a particular make, model or configuration of server.

Figure 2: Second of two target racks

Server Model	CPU Architecture	Socket Count	Processor	Qty
Dell PowerEdge R6515	AMD EPYC (Rome)	1	EPYC 7402 (24-core) EPYC 7352 (24-core) EPYC 7302 (16-core)	4
Dell PowerEdge R6525	AMD EPYC (Rome)	2	Dual EPCY 7F72 (24-core)	4
Dell PowerEdge R640	Intel Xeon Scalable	2	Xeon Silver 4110 (8-core) Xeon Gold 5118 (12-core) Xeon Gold 5120 (14-core) Xeon Gold 6130 (16-core) Xeon Gold 6140 (18-core) Xeon Gold 6138 (20-core)	4

Pre-optimisation Results

Baseline telemetry was collected for all 50 servers across a defined observation window through the use of rack-level PDU meters, allowing the independent measurement of power draw both pre and post-optimisation.

The table below shows the results from this period.

Hosts monitored	50
Baseline window	17.38 hours (17h 23m)
Average per-host power	177.96W
Estate average power	8.9kW

Measurement Scope and Limitations

Workloads were not artificially controlled but remained consistent in operational context.

PDU metering provides aggregated rack-level data rather than host-level granularity.

Validation measures IT power only; cooling or facility-wide PUE effects are out of scope.

Cost calculations and impact are secondary and indicative only.

Post-optimisation Results

After the benchmark was completed, ServerOptix was deployed on all hosts and optimisation enabled.

The test window continued for a further two weeks, where the power consumption and performance were monitored to allow the comparison of before and after the deployment of ServerOptix.

The following table summarises the findings of the rack-level PDU data capture.

	Baseline	Post-optimisation	Delta
Average per-host power	177.96W	115.67W	⌄ 62W / 35%
Estate average power	8.9kW	5.78kW	⌄ 3.1kW / 35%

Analysis of Results

The reductions in energy consumption across the broad range of server configurations used demonstrates an increase in energy efficiency.

The 3.1kW metered drop, and the agreement between per-server reduction (~62W) and baseline levels (~178W), confirm technical validity.

Throughout the testing window, workload remained consistent on all hosts, with no impact on performance seen after enabling ServerOptix.

Energy Impact

This sustained 3.1kW reduction for the 50 hosts corresponds to ~74.4kWh/day reduction if maintained continuously. At £0.24/kWh, this projects to ~£6,517pa savings.

Taking the UK average CO_2e intensity for 2025 of 170g CO_2e/kWh, this equates to 4.8tonnes of CO_2e emissions avoided per year.

Conclusion

This validation demonstrates that ServerOptix can produce sustained reductions in server-level power draw at scale within a production environment. Although broader facility-level impacts were out of scope, the stability of the measured power changes shows that the optimisation effect is reliable and can be verified independently. Consistent performance from the servers from the hosts throughout the test period demonstrates ServerOptix has zero or near-zero impact on server performance in the typical workload scenario utilised for the purposes for this test.

References

- Baseline telemetry report - 02 Sep 14:37 to 03 Sep 08:00 (17.38h)
- Rack PDU metering data (Qnetix production racks).
- Qnetix deployment server specifications (Qnetix production racks).
- Tariff used in secondary interpretation: £0.24/kWh (December 2025 UK average).
- Carbon Dioxide Equivalent intensity, UK 2025 average: 177g (nowtricity.com).

Qnetix

QiO Technologies' ServerOptix is a very effective solution and has helped us significantly reduce our power usage and power cost.

We have seen server energy savings of 35% across our cloud estate with the product delivering on its promiise of efficiency.
It is easy to install, easy to run, and is completely self-contained - it took just hours for it to be up and running on all 50 hosts!

In my opinion, ServerOptix is one of the go-to tools for enhancing our sustainability efforts and operational efficiency.

Seeing such phenomenal savings with zero perceptible performance degradation is a brilliant result for us and our customers, both in terms of monetary savings and sustainability goals.

The QiO team's responisvness to our feedback and their commitment to continual improvement has been exceptional and we look forward to upcoming releases.

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