

Optimizing Infrastructure. Reducing Risk.



Business Objective

A colocation operator required a full MEP design for a 4 MW data centre that could support mixed rack density loads, meet global redundancy, fault tolerance and expected uptime standards as well as ASHRAE standards, delivering a scalable, high-availability electrical and cooling architecture from the ground up.

BUSINESS NEED

Design a Robust 4 MW Electrical Infrastructure

- Engineer a dual-feed 2N UPS, N+1 generator, and power distribution architecture to guarantee maximum uptime across the full 4 MW IT load.

Deliver a Hybrid Cooling Solution for Mixed Rack Densities

- Design cooling infrastructure capable of supporting both standard 6–10 kW base loads and high-density 15–20 kW rack profiles simultaneously.

Validate Design Through Advanced Engineering Analysis

- Use ETAP power analysis and CFD airflow modelling to validate and optimise the design before physical implementation.

SOLUTION & IMPACT

4 MW Fault-Tolerant Electrical Architecture Delivered

- A 2N UPS, N+1 generator, 20 kL fuel storage, and dual-feed distribution delivered a fully redundant 4 MW platform, validated by ETAP before installation.

Hybrid Cooling Designed for 2x Density Profiles

- A dual-mode cooling system supporting 6–20 kW rack loads enabled flexibility for diverse tenant needs without compromising infrastructure.

ETAP Validation Eliminated Design Risk

- Advanced power flow and 3D airflow modelling mitigated hotspots and voltage risks before construction, ensuring a compliant, optimised design.

Conclusion

Technavious engineered a comprehensive, future-ready MEP design for a 4 MW colocation data centre combining robust electrical redundancy, hybrid cooling flexibility, and rigorous computational validation. The result was global uptime compliant, ASHRAE-aligned design that gave the client full confidence to proceed to build without risk.