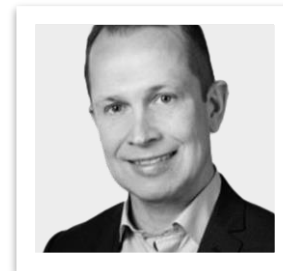


ARPA-E workshop

December 14, 2021



Dr. Tomas Rahkonen

Research Director, Distributed Data Centers

[Uptime Institute](#)

2022 Intelligence Feature Reports

Q1 2022

Digital infrastructure predictions for 2022

The edge data center supplier ecosystem

Annual outage analysis 2022

Q2 2022

Electromagnetic pulse - The threat, the response

Direct Liquid Cooling - The business case for enterprises and service providers

DCIM, AI and automated operations

Q3 2022

Uptime Institute global data center survey 2022

Achieving Net Zero - The good, the bad and the ugly

Disruptive technologies and critical infrastructures, 2025-2035

Q4 2022

From demand response to smart energy

Carbon reduction via cloud migration - Moving from enterprise to cloud

Getting off diesel - Potential approaches

Uptime Institute Global Data Center Survey 2021

Organizations are not closely tracking their environmental footprint despite the global sustainability push.

Job security is strong because the data center skills shortage persists, but AI may reduce staffing needs in the future.

The number of outages has declined, but the consequences continue to worsen.

Pandemic pressures and more disrupt data center supply chains.

Data center suppliers expect large cloud and internet companies to reshape the supply chain.

Rack density levels are creeping up.



Uptime Institute's annual survey, now in its eleventh year, is the most comprehensive, longest-running study of its kind in the data center sector. The findings reveal significant growth but also increasing complexity and challenges for owners and operators of mission-critical digital infrastructure, and for the suppliers that serve them.

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35-45 MINUTES TO READ

The data centre industry is conservative

Overall, very conservative with new technologies - owners/operators are slow to stake their reputations

Availability – IT service uptime,
Service Level Agreements

Once built, most need to operate with the technology for years before getting money to do upgrades



Getting a new technology accepted

It must not negatively impact availability

It needs to have a demonstrable performance and history of doing what it claims to do (can be hard)

It must significantly move the needle on other items as well such as sustainability, reduced project risk/delivery time, or regulatory compliance



The big players drive most innovations

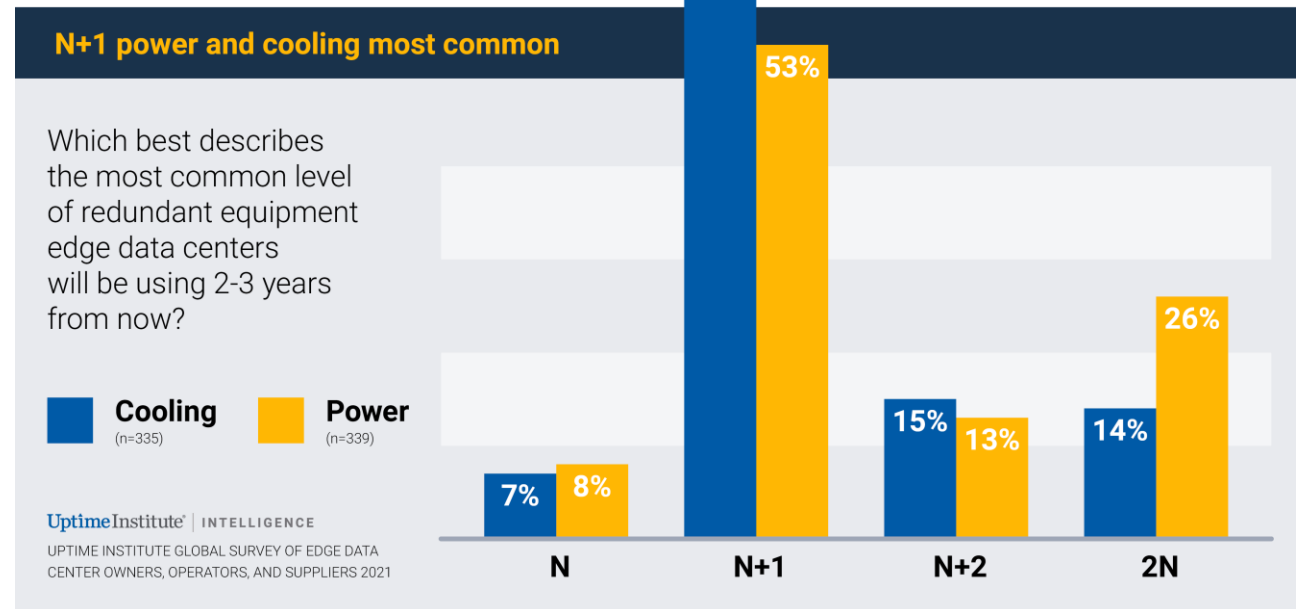
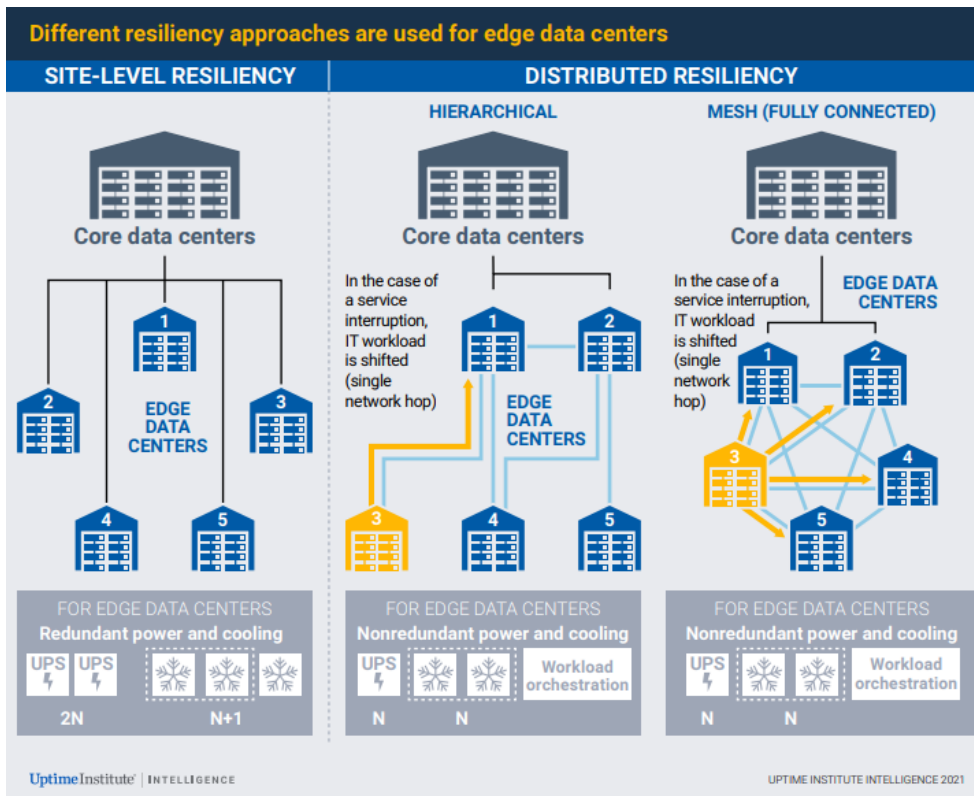
Most of the real innovations (at scale) with new, risky technology occurs in the big players

Have to do it for PR

Have the financial means to fail and not kill their bottom line



Edge data center resiliency approaches



Sustainability regulations

New data centers in Amsterdam must have a PUE of 1.2 or lower, while existing buildings must achieve a PUE of 1.3

Irish CRU* recently published direction for data center grid connection applications**

constrained or unconstrained region of the electricity system

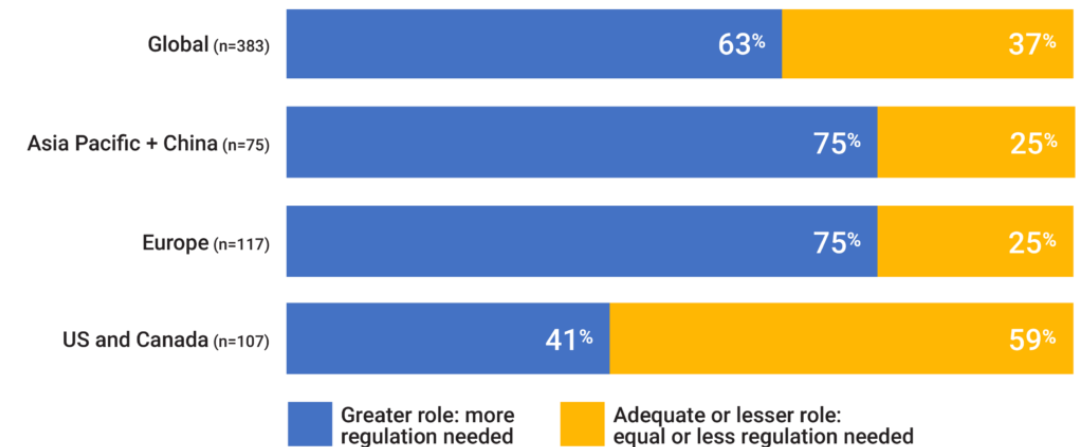
onsite dispatchable generation (and/or storage) equivalent to demand

ability to reduce consumption when requested

Tie power discounts to sust. requirements?

Appetites for sustainability laws differ by region

What role do you think government regulations should play in improving the overall environmental sustainability of the data center sector?



UPTIME INSTITUTE CLIMATE CHANGE SURVEY 2021

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