

RESEARCH AGENDA

All content prior to May 2023 has been published.
All unpublished topics and months of publication are subject to change.

MONTH	TITLE	DESCRIPTION
Jan 2023	Cloud migrations to face closer scrutiny	More often than not, chief information officers responsible for mission-critical IT have seen a move to the public cloud as low risk, flexible, forward-looking and, ultimately, inexpensive. But these assumptions are now under pressure.
	Data center costs set to rise and rise	Ongoing supply chain issues and rising labor, energy and capital costs are all set to make building and running data centers more expensive in 2023 and beyond.
	Accounting for digital infrastructure GHG emissions	Digital infrastructure operators will soon have to report across owned, colo and public-cloud data centers: meaning the industry needs to establish standards and processes to enable the efficient exchange of the necessary data.
	High costs drive cloud repatriation, but impact is overstated	Unexpected costs are driving some data-heavy and legacy applications back from public cloud to on-premises locations. However, very few organizations are moving away from the public cloud strategically — let alone altogether.
	Energy efficiency focus to shift to IT — at last	Server and storage infrastructure account for the largest proportion of a data centers' power consumption and physical footprint. As such, they offer the greatest potential for energy-efficiency gains and footprint reduction..
	EU bids farewell to 2022 with a host of resiliency regulations	European Union regulators wrapped up 2022 with new legislation that introduced stricter requirements for data center operators.
	EED recast: new reporting proposals raise confidentiality concerns	The publication of the EC's EED scoping document presents major concerns for data center operators. What's in the scoping document, what are the key risks for operators and owners, and what should industry players be lobbying for?
	Too hot to handle? Operators to struggle with new chips	Power-hungry chips and dense IT infrastructures are upending past assumptions around power density and cooling. As such, data center capacity planning will have to accommodate a shifting balance between power, cooling and space.
	Geopolitics deepens supply chain worries	Geopolitical risks threaten global supply chains and the subsea cable fiber optic network upon which operators rely on for key components and global interconnection.
	What most interested Uptime Institute members in 2022?	The Uptime Institute's community was most engaged in topics related to resiliency, industry trends and sustainability in 2022. Compared with 2020 and 2021, little attention was paid to issues surrounding COVID-19.
Feb 2023	Five data center predictions for 2023	Some of the challenges and trends for 2023 include rising costs, negative trends in geopolitics, pressure to improve energy efficiency and wariness of public cloud.
	Uptime Institute Data Center and IT Spending Survey 2022	How are enterprise operators and colocation providers adapting their spending strategies to meet the growing demand for digital services?
	Forecasting the solar storm threat	A proposed network of electromagnetic monitoring stations across the continental US could facilitate accurate predictions of geomagnetic disturbances — avoiding disruption and damage to data centers and other IT infrastructure.
	US operators scour Inflation Reduction Act for incentives	The US Inflation Reduction Act allocates billions of dollars for clean energy, efficiency and energy storage. This report identifies the tax credits available to data center owners / operators and describes the requirements for qualification.

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	Cooling to play a more active role in IT performance and efficiency	Better cooling increases the performance envelope of modern processors, a phenomenon actively exploited in supercomputing. As processor thermal challenges grow, data center cooling will play an active role in compute speeds.
	Asset utilization drives cloud repatriation economics	Organizations hosting applications with predictable capacity requirements in on-premises data centers have a cost advantage that cloud providers do not: the ability to pay only for those servers that are used, and not those sitting idle.
	Uptime Institute Data Center Capacity Trends Survey 2022	Uptime Institute's Data Center Capacity Trends Survey 2022 reveals growing data capacity at site level, increased hybrid IT awareness and growing cost concerns.
	Comparative availabilities of resilient cloud architectures	Is one public cloud as resilient as another? Uptime Institute uses data from AWS, Google and Microsoft to calculate availabilities of several cloud architectures, including multi-cloud.
March 2023	Sustainability: IT Efficiency Q&A	Topics discussed in this Q&A include the improvement of IT systems efficiency, key metrics, utilization rates, equipment selection, and power management and systems-level software.
	The effects of a failing power grid in South Africa	South Africa presents an example of how grid stability can affect data center operation. The country has suffered from an energy crisis for the past 16 years, and yet emerged as the region's primary data center hub.
	Data shows the cloud goes where the money is	Why is the public cloud so much stronger in some parts of the world — and where will the internet giants build out next? Just look at the GDP.
	EED reporting and indicators: a wake-up call	The EU Commission has published the Final Draft of data center data and indicator reporting requirements in support of the EED recast. These requirements have far-reaching implications for the data center industry.
	Uptime Institute Global Data Center Survey 2022 Q&A	Topics discussed in this Q&A include regulations, sustainability, outages, supply chain issues and staffing.
	Annual outage analysis 2023	Uptime Institute Intelligence analyzes the causes, impact and lessons learned from recent outages using data from multiple sources.
	Uptime Institute Data Center Supply Chain Survey 2022	The Uptime Institute Data Center Supply Chain Survey 2022 investigates how operators and vendors are navigating ongoing supply chain disruptions.
Apr 2023	24x7 carbon-free energy (part one): expectations and realities	Many organizations are setting net-zero goals, which means data center operators need to move to 100% 24x7 carbon-free energy in the next decade. However, with current technologies this is not economically feasible in most grid regions.
	Sustainability: GHG emissions and renewables procurement Q&A	Topics discussed in this Q&A include the management of greenhouse gas emissions data, the challenges of Scope 3 emissions, and the procurement and reporting of renewable energy.
	Sustainability: regulations, reporting and facilities management Q&A	Topics discussed in this Q&A include sustainability regulations and standards, the collection and reporting of sustainability data and efficient design and infrastructure choices.
	Where the cloud meets the edge	Some public cloud providers offer infrastructure-as-a-service products at the edge to help meet the growing demand for building low-latency applications. Customers should understand these options to avoid making costly mistakes.
	Server efficiency increases again — but so do the caveats	The latest server technologies offer major efficiency gains to at-scale IT services providers, AI developers and HPC shops, but for enterprises the benefits will be fewer and harder to achieve.
	Cloud resiliency: plan to lose control of your planes	Losing the ability to administer a cloud during a control plane outage isn't just an inconvenience; it can bring down cloud-native applications because of capacity constraints. A buffer of capacity is needed — albeit at a price.

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	Approaches to sustainability vary widely	Most data center organizations conduct climate-related resiliency assessments — but these assessments do not track or report the same metrics consistently.
	Design resilient applications to reduce cloud concentration risk	Cloud market concentration and poor visibility drive risk exposure; resilient single-cloud architectures must be prioritized before considering dual-cloud implementations.
May 2023	Operators face wider range of resiliency challenges	The Uptime Institute Data Center Resiliency Survey 2023 explores how operators assess operational risks and highlights opportunities for strengthening mitigation strategies.
	Server energy efficiency: five key insights	This report analyzes the efficiency of mainstream servers built around the latest AMD and Intel processors, using data from The Green Grid's SERT database.
	24x7 carbon-free energy (part two): getting to 100%	To meet their net-zero goals, data center operators must transition to 100% 24x7 carbon-free energy consumption. Making the transition will require the use of innovative energy retail contracts and energy storage technologies.
	Five data center predictions for 2023 Q&A	Topics discussed in this Q&A include energy and sustainability, direct liquid cooling, regulation, edge adoption, and IT and construction costs.
	Energy security for data centers	Energy security is no longer a given due to a variety of factors, including increasing rates of extreme weather, an outdated grid infrastructure, higher proportion of intermittent generators, energy supply shocks and high energy prices.
	Pull-the-plug data center testing: what it is, who's doing it, and why?	Best practices in power system testing include an annual "pull-the-plug test" to ensure the performance of every component when disconnecting from utility power. Uptime Institute looks at those organizations that perform rigorous tests.
	Data center operators face more grid disturbances	High energy prices, geopolitical instability, extreme weather events, and increased reliance on intermittent renewable energy will lead to more outages. Data center operators can take steps to remain resilient in stressed regions.
	Supply chain disruptions affect critical facilities equipment	Supply chain issues continue to affect lead times for critical facilities equipment. However, not all are affected equally — especially colocation organizations and enterprises with significant purchasing power.
	CSRD and EU code of conduct	This report provides an overview of the key EU sustainability initiatives relevant to organizations that own / operate European data centers or make use of them as tenants / users: including scope, reporting thresholds and audit requirements.
	Data centers sustainability in need of the x-factor	Modulating inlet air temperature inside the data hall results in energy savings and improves a data center's sustainability performance. This sustainability comes with the increased risk of higher IT hardware failure rates.
	Will the cloud ever deliver on RAS?	A growing share of enterprises feel comfortable entrusting the cloud with their sensitive workloads. But this change is not always out of the development in cloud services, but rather from a willingness to make a compromise – or to ignore it. .
	Timing resiliency: satellites as a single point of failure	Secure, reliable IT applications often depend on satellites for accurate timekeeping. Satellites or data center GPS receivers can be a single point of failure. Protections and alternate time references are available for resiliency.
	Lithium-ion and fire: is it under control?	A number of recent data center fires involved lithium-ion batteries — either as the cause or a contributing factor. What are the steps operators should take to secure their lithium-ion deployments?
	Not all lithium-ion is created equal	Lithium-ion batteries have unique chemistries, which result in different behavior, fire-risk profiles, sustainability characteristics among others.
	The state of site selection: is anything changing?	The push and pull factors for data center site selection have evolved in recent years. Regulations, climate and sustainability-related risks, and power infrastructure limitations have some organizations considering new locations.

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	Precision timing — resiliency, timing as a service	Accurate time synchronization underpins the reliability and security of many IT workloads. The choice of implementation affects performance, cost and potential vulnerabilities.
	24x7 renewable energy Q&A	Topics discussed in this Q&A include the procurement and reporting of renewable energy, challenges of reaching 100% carbon-free energy and the embedded emissions of energy generation.
	Annual outage analysis 2023 Q&A	Topics discussed in this Q&A include the costs, frequency, severity and causes of outages from Uptime Institute's 2022 report and analysis.
	Uptime Institute Cooling Systems Survey 2023	What does a sustainable or viable cooling system look like? Operators share insights into direct liquid cooling — what technologies they are using and considering, and when (if ever) air cooling will no longer dominate.
	Use tools to control cloud costs before it's too late	On-demand pricing let's cloud customers consume what they need when needed, settling their bill at the end of the month. The downside is that, left unmanaged, costs can rapidly get out of control. Cloud buyers must act to manage their budgets.
	Uptime Institute Resiliency Survey 2023	The Uptime Institute Data Center Resiliency Survey 2023 explores how operators assess operational risks and highlights opportunities for strengthening mitigation strategies.
	Regulatory bubble chart and summary table	As regulation affecting data centers increases around the world, this chart and table will catalogue and provide a brief description of select regulations.
Jun 2023	Key sustainability indicators	Improving environmental sustainability performance requires tracking key metrics. This report looks at the key sustainability metrics operators need to collect and monitor to inform a successful sustainability strategy.
	Operators are running servers for longer	Technical and economic factors will drive future deployments of direct liquid cooling. Uptime Intelligence looks at the current standardization efforts and the elements that will need consensus to reach a mature product ecosystem..
	Liquid cooling needs a standard	Technical and economic factors will drive future deployments of direct liquid cooling. Uptime Intelligence looks at the current standardization efforts and the elements that will need consensus to reach a mature product ecosystem..
	Forever chemicals in data centers	Many data centers use PFAS compounds in refrigerants or immersion but environmental concerns over these "forever chemicals" foreshadow restricted availability. As such, data center designs may need to look at the alternatives.
	Critical infrastructure regulation overview (Part 1)	Governments are becoming ever more aware that economic stability is now heavily dependent on critical digital infrastructure. It is too important to leave to the market - they will regulate to ensure availability and resiliency.
	Resiliency and failure modes in liquid cooling	Direct liquid cooling challenges the conventional division between the responsibilities of IT teams and data center facilities teams — raising novel concerns for design topology, redundancy and failure modes.
	Server efficiency: deployment, refresh and migration strategies	Using measured efficiency performance data, operators can plan how and when they deploy and refresh servers - on premise and beyond..
	Sustainability software for data centers	Customers, shareholders and regulators will soon demand an unprecedented level of reporting on sustainability metrics. This report investigates a new generation of software tools designed to meet this challenge.
Jul 2023	Uptime Institute Global Data Center Survey 2022	The Uptime Institute Global Data Center Survey 2023 report highlights the findings from the longest-running survey of its kind and covers the latest updates on topics including outages, sustainability, cooling, capacity and more.
	Financial services digital infrastructure operational resiliency (Part 2)	Financial markets regulator their markets tightly to reduce risk and ensure availability and resiliency. Increasingly, as systems and services are outsourced, that means regulating digital service providers too.

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	Business models at the edge	Edge data center demand has not so far matched expectations. This report discusses building and operating edge data centers, and the underlying business models.
	Data destruction: environmental impact and secure disposal report	Every year, data center customers are shredding millions of working hard drives. This report investigates whether the risks posed by used storage devices can be managed differently — and whether the drives could be recycled.
	Uptime Institute Edge Survey 2023	Findings from the Uptime Institute Edge Survey 2023 reveal how organizations are adapting to growing demands for reduced latency and bandwidth.
	Heat reuse — business and energy trade-offs	Server heat reuse delivers sustainability benefits and is becoming more popular among data center operators. This report investigates the cost of such initiatives, their impact on efficiency and other considerations.
	Constructing a work delivered per megawatt-hours consumed metric schedule	Sustainability programs have gained consensus on several metrics for benchmarking and comparison. However, there is no fixed metric to measure useful IT work per unit energy consumed. Uptime Institute looks at the current methods.
Aug 2023	Data center management software: supplier landscape	This research paper profiles data center infrastructure management software vendors, and analyzes their strengths, weaknesses, opportunities and threats.
	Evolution of data center management	This research paper looks at the origins of data center infrastructure management as a software category, and investigates its many faults. What direction should it take going forward to meet the needs of customers?
Sep 2023	Long-term battery storage options	Long duration energy storage (LDES) is a promising technology for data centers looking to reduce generator use. This report examines the current state of LDES and identifies the use cases and trade-offs for novel LDES technologies.
	Understanding cloud data storage	Cloud-native architectures demand a range of data stores, which can differ quite significantly from traditional options, most notably in terms of scalability and resiliency. This report provides an overview of the current state of the art.
Oct 2023	Data Center and IT Spending Survey 2023	Results from the Uptime Institute Data Center and IT Spending Survey 2023 highlight how organizations have adapted their strategies for expanding capacities through increased costs and staffing challenges.
	Disruptive technologies and innovations	Uptime Institute Intelligence considers leading-edge technologies in the data center and examines their ability to disrupt the facility designs, business models and ecosystems of the industry.
	Resiliency / reliability of stateful applications in the cloud	This report examines how application cost and carbon emissions are impacted by an increase in application resiliency, with a focus on the impact of choice of database and data store.
	Automation in the data center	Automation in the data center can help operators handle complexity and improve operational efficiency. Which tasks can be automated today, and what effect does automation have on the primary objective of resiliency?
Nov 2023	Uptime Institute Capacity Trends and Cloud Survey 2023	This report investigates what drives data center operators to provision, or repatriate applications in public cloud, and the different strategies for expanding capacities used by enterprises and colocation providers.
Dec 2023	Uptime Institute Supply Chain Survey 2023	Findings from the Uptime Institute Supply Chain Survey 2023 reveal operators' ongoing challenges with data center suppliers, and which strategies have been most successful in navigating extended lead times.
	Five data center predictions for 2024	Uptime Institute Intelligence looks beneath the most readily apparent trends to examine five factors influencing the data center industry as it enters 2024, bringing challenges and change.