

# Uptime Institute Data Center Cooling Systems Survey 2021

Q3 2021

## KEY FINDINGS

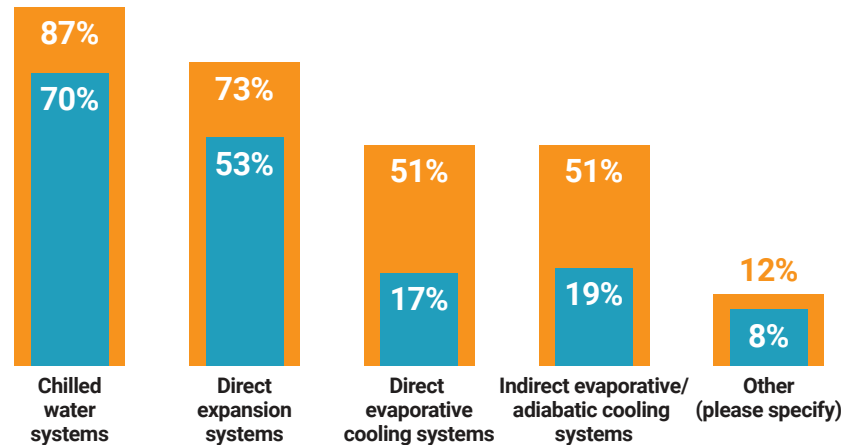
- Air cooling dominates the sector; data center operators are most familiar implementing chilled water and direct-expansion systems. At present, direct liquid cooling is niche.
- Direct liquid cooling may become the primary cooling method, driven by rack density, electricity cost and sustainability efforts. Adoption timeframes vary but most see the same barriers.

### ABOUT THIS SURVEY

The Uptime Institute Data Center Cooling Systems Survey 2021 was conducted in August and September 2021 and had over 600 global respondents, including data center user/owner/operators and suppliers.

## Chilled water systems most favored

- Which of the following data center air cooling approaches are you familiar with? Choose all that apply. (n=402)
- What type of air cooling approaches does your organization utilize in its data center(s)? Choose all that apply. (n=402)



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## Few think air cooling will remain dominant beyond 10 years

Regarding data centers 1 MW or greater, for how long do you think air cooling will remain the dominant approach? (n=413)



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## Some see coming influx of liquid-cooled servers

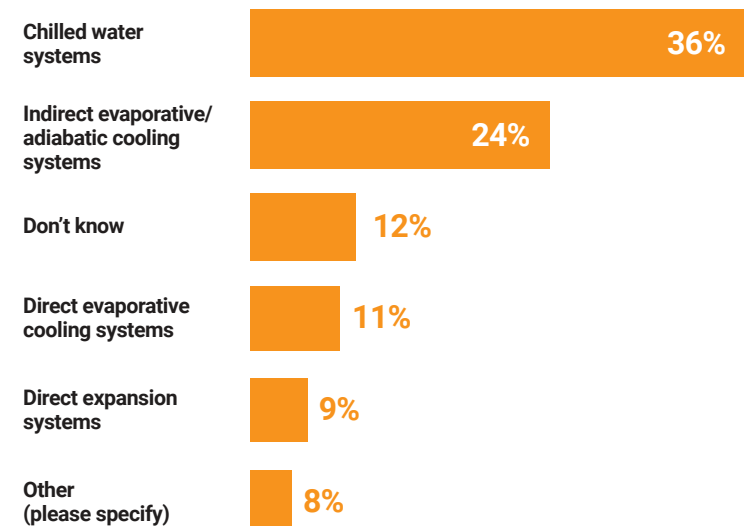
Looking ahead three years, in your opinion how likely is it that immersion and/or direct-to-chip liquid cooling will be the primary approach to server cooling? (n=428)



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## Chillers lead in sustainability credentials

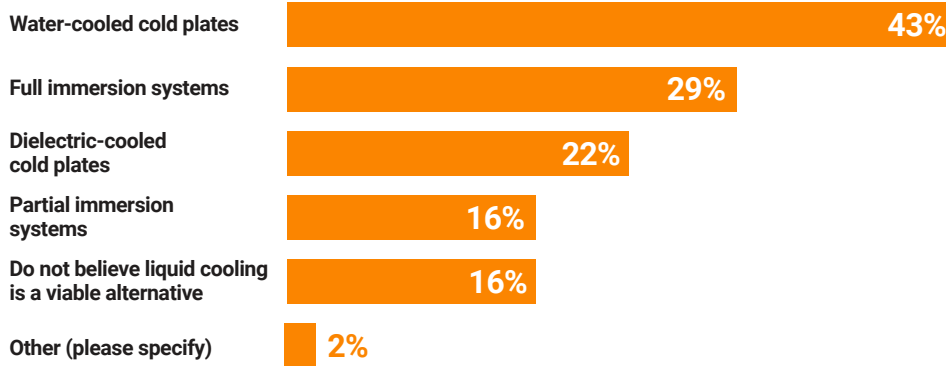
Which of the following data center air cooling approaches would you say is the most environmentally sustainable? (n=551)



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### Cold plates considered most viable alternative

Which of these direct liquid cooling techniques – if any – do you think are currently viable cooling approaches in data centers? Choose all that apply. (n=481)

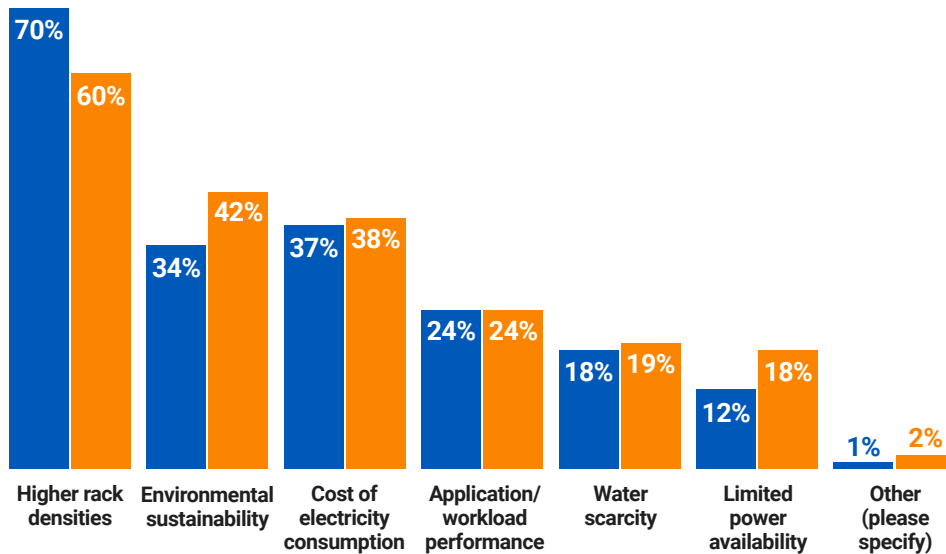


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### Density, power and sustainability drive uptake

Currently, which of these do you think are the primary drivers for immersion and/or direct-to-chip liquid cooling adoption? Choose no more than two. (n=450)

Which of these do you think will be the primary drivers for immersion and/or direct-to-chip liquid cooling adoption three years from now? Choose no more than two. (n=448)



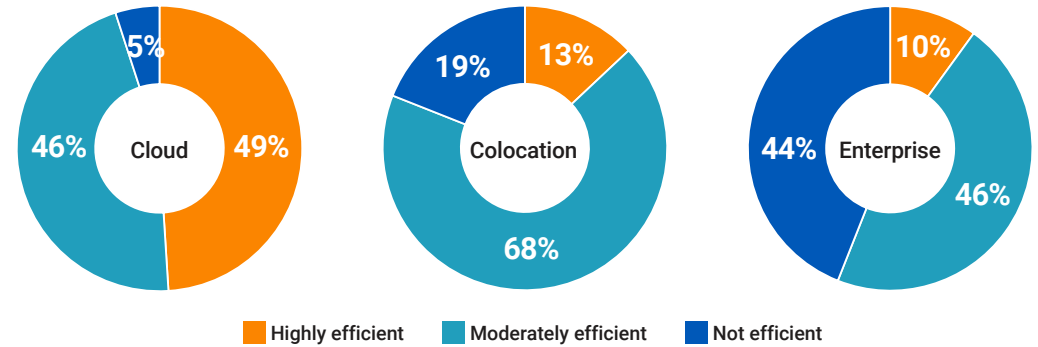
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### Only half think cloud is highly efficient

Generally speaking, how would you rate the overall efficiency of data center cooling systems currently being operated by large cloud and internet companies (e.g., Amazon, Facebook, Google, Microsoft)? (n=395)

Generally speaking, how would you rate the overall efficiency of data center cooling systems currently being operated by colocation providers? (n=395)

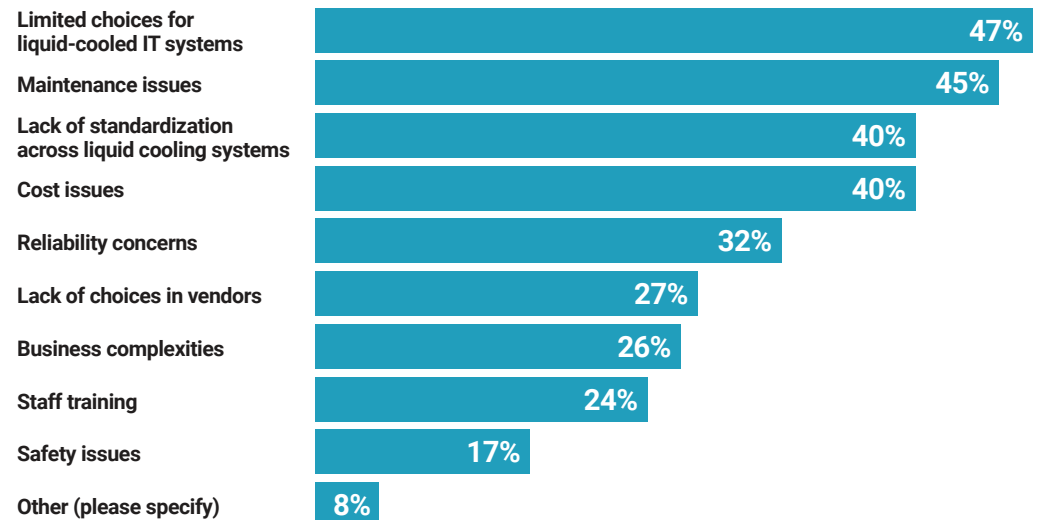
Generally speaking, how would you rate the overall efficiency of data center cooling systems currently being operated by enterprise operators? (n=404)



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### Limited choice hinders liquid cooling adoption

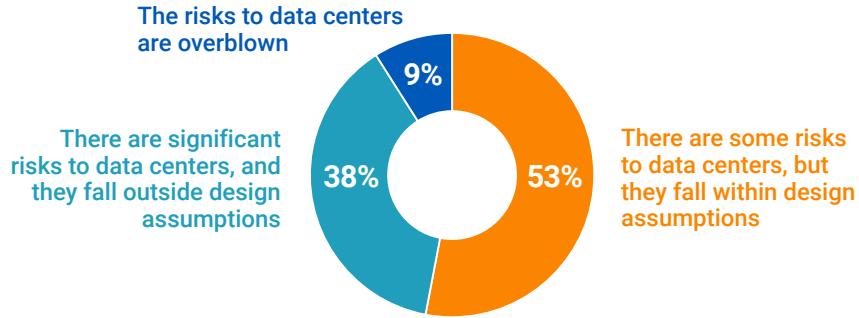
Which of the following do you think are the biggest barriers to adopting direct liquid cooling in data centers? Choose no more than two. (n=472)



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## Climate change adds risk to many operations

Looking ahead three years, how would you rate the risks of global climate change/extreme weather to data center operations? (n=421)



## ABOUT UI INTELLIGENCE

Uptime Institute (UI) Intelligence is an independent unit of Uptime Institute dedicated to identifying, analyzing and explaining the trends, technologies, operational practices and changing business models of the mission-critical infrastructure industry. For more about Uptime Institute Intelligence, visit [uptimeinstitute.com/ui-intelligence](https://uptimeinstitute.com/ui-intelligence) or contact [research@uptimeinstitute.com](mailto:research@uptimeinstitute.com).

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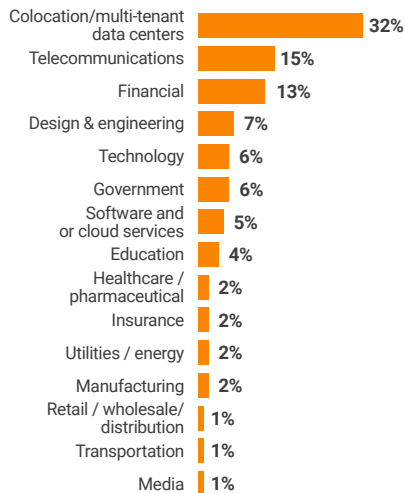
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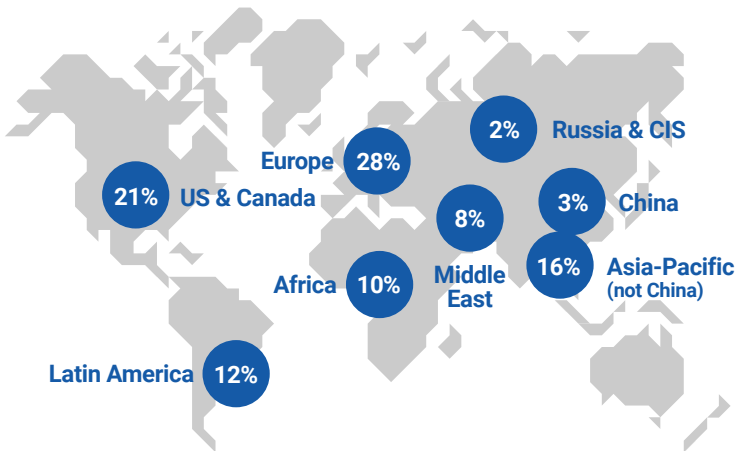
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## Uptime Institute Data Center Cooling Systems Survey 2021: End user demographics

### Verticals (n=229)



### Company location (n=239)



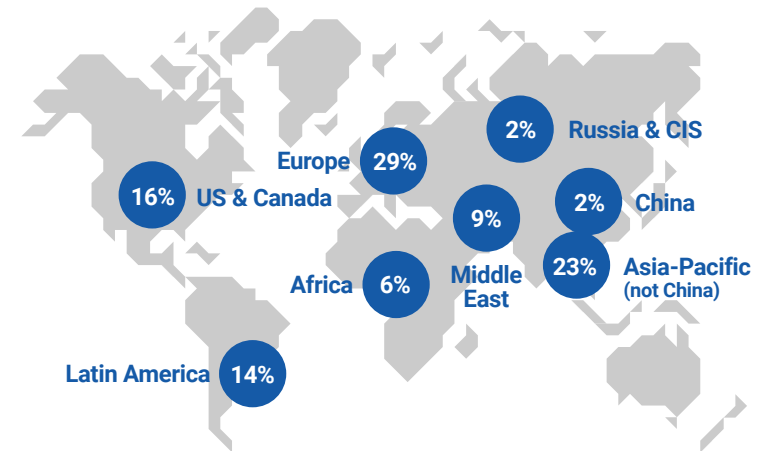
### Job function (n=244)



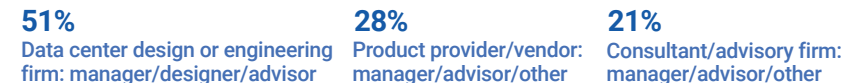
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## Uptime Institute Data Center Cooling Systems Survey 2021: Vendor demographics

### Company location (n=174)



### Job function (n=179)



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