Uptime Institute INTELLIGENCE

STAFFING &TRAINING

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Staffing: Responding to the operations skills shortage

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Data center owners and operators share their experiences of the data center staff and skills shortage, especially as it relates to facilities staff. In this report, based on interviews and surveys, data center managers discuss the impact of the shortage on their operations and the strategies they have developed for coping.

15-20 minutes to read

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This Uptime Institute Intelligence report covers:

ABOUT UPTIME INSTITUTE INTELLIGENCE

Uptime Institute 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 https://uptimeinstitute.com/ui-intelligence.

KEY FINDINGS

- The number, size and staffing needs of data centers around the world have grown very rapidly — faster than colleges, recruitment practices and salaries have adapted.
- There is nearly universal concern about skills and staffing shortages, but individual facilities experience the problem differently, depending on factors such as location, growth, local competition, staffing models and management practices.
- The adaptive strategies adopted by many operators may have somewhat hidden or disguised the overall problem. Many data center operators have identified strategies to help them cope with the skills and staffing shortages, limiting its impact to date.
- High qualification requirements limit the number of qualified workers. Operators may be forced to lower entry requirements and train more.
- Competition from hyperscale operators has distorted the job market in some areas, and a high concentration of data center facilities (of any type) in a given region can make recruitment and retention challenging.
- The lack of a succession plan for experienced staff is a significant problem for some organizations, especially if many employees are due to retire around the same time.
- Over three-quarters of respondents to the 2018 Uptime Institute data center survey reported that budget constraints or failure to secure management approval were barriers to meeting staffing needs.

Methodology

To develop a greater understanding of the causes and extent of the staffing shortage and of strategies to address the problem, Uptime Institute reviewed staffing-related data from four of its annual data center surveys (2011, 2017, 2018 and 2019). We then interviewed seven data center operators about their perceptions of the data center labor market and how they address staff openings and succession issues in their own organizations.

Introduction

The deepening skills shortage

Data center owners and operators have long been concerned about a lack of qualified, available staff. The number, size and job needs of facilities have grown very rapidly — faster than colleges, recruitment practices and salaries have adapted.

For at least a decade, Uptime Institute Network members and others have said that recruiting staff is difficult. The reasons cited include:

- The sector is largely invisible. Most students/members of the general public have a low level of familiarity about data centers or the sector's career paths, which causes them to overlook careers some would find rewarding.
- Gender and other demographic imbalances may have deterred some candidates from seeking a career in the field and reduced the size of the labor pool. For those working in the industry, a lack of diversity can create staff retention issues (among other negatives).
- Fundamental aspects of the job, such as being scheduled for second- or third-shift work (especially in 24/7 operations), limited pay and high skill requirements for even entry-level positions, can reduce the number of qualified applicants.

The result is a shortage of skilled candidates that is nearing a crisis. As Figure 1 shows, over 60% of respondents to our 2019 Data Center Survey are having trouble finding or retaining staff. Uptime Institute found evidence of all these concerns in interviews with data center owners and operators (see the **Appendix**).

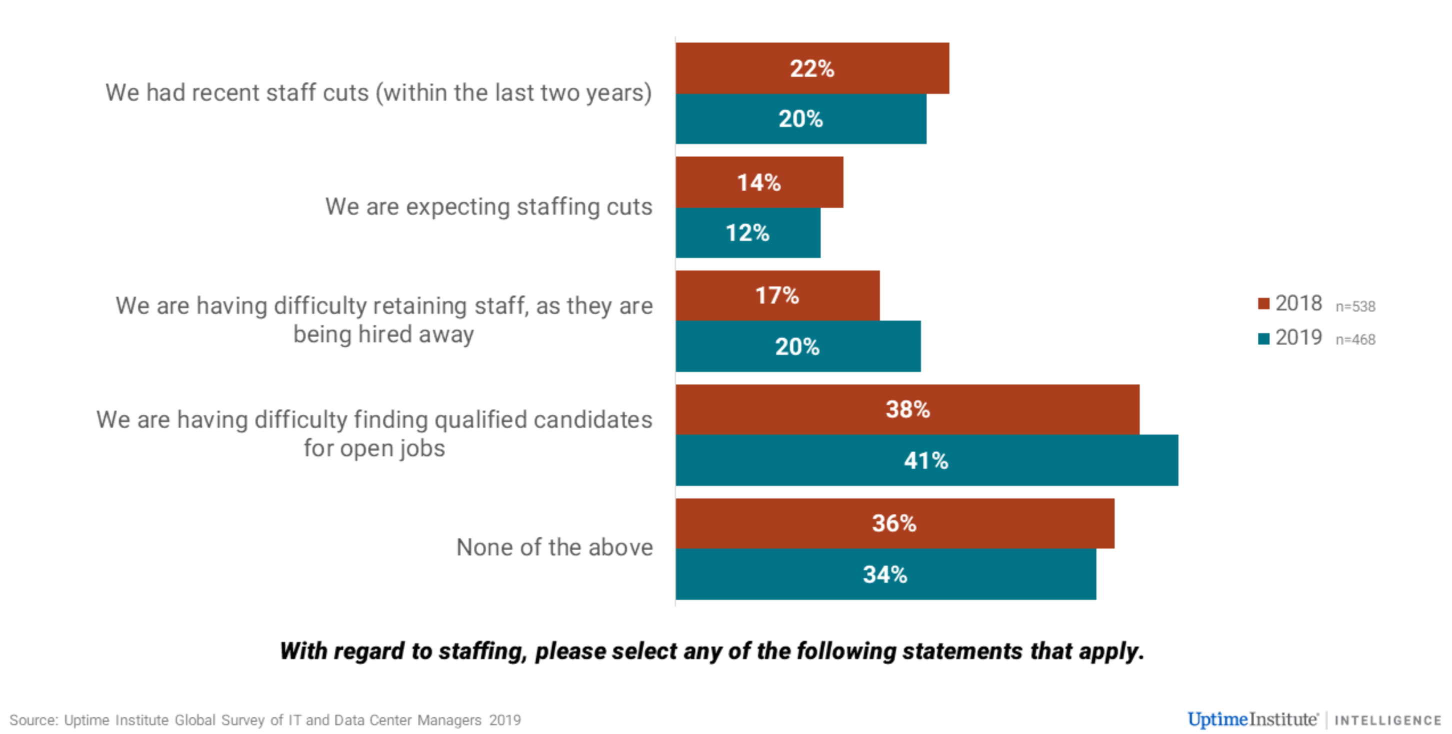

Figure 1. **The data center skills shortage is getting worse**

Over 65% of respondents to the 2019 survey said they were adequately staffed, recently experienced cutbacks or were expecting cutbacks (respondents could select more than one answer). The size of this group suggests that some geographies or verticals may be feeling the impact of the skills shortage more directly and that some enterprises have developed strategies to help them meet their staffing needs effectively. However, it is clear that demand will continue to increase for at least five years, and probably longer. Until increased automation reduces labor requirements and low-staffed hyperscale and remotely managed edge facilities pick up more of the IT workloads, staffing shortfalls show few signs of easing.

In 2019, Uptime Institute spoke at length with several data center managers about their facilities' staffing situations and concerns. Each has a unique situation, but there are some common threads. The interviews (see the **Appendix**) suggest that in some cases:

- Large hyperscale operators have distorted the labor market, attracting much of the available talent.
- A tight overall job market, especially in the United Stated (US), means that fewer individuals need jobs. This reduces the number of people looking for work and makes lateral transfers from other industries or departments less attractive.
- The long-predicted "silver tsunami" will occur when a cohort of experienced professionals retire and leave behind numerous unfilled jobs and a vast experience gap.

Impact to date

While there is little doubt the problem is growing, Uptime Institute interviews and survey data suggest that the impact of the staffing problem has been managed well to date, in most cases: almost seven in 10 operators reported adequate staffing levels in our 2011 and 2018 surveys. Figure 2 shows that concerns about staffing levels remained unchanged, with only three in 10 reporting understaffing.

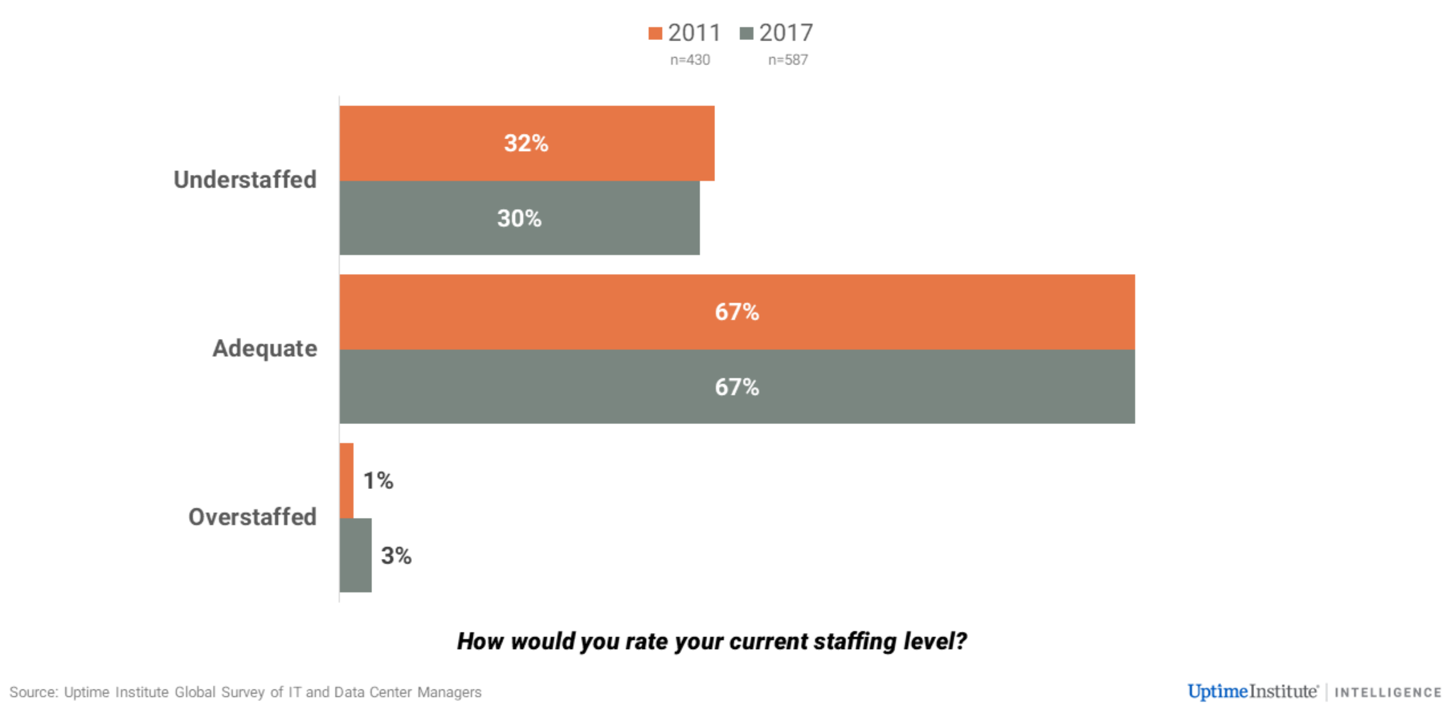

Figure 2. **Shortages of qualified personnel have not yet affected staffing levels**

Most operators think their own organization, rather the industry or the market generally, is wholly or largely responsible for their own recruitment/retention/understaffing problems. In both 2011 and 2018, approximately three-quarters of respondents blamed budget or management issues for understaffing in their facilities, with only slightly more than one-fifth of respondents reporting that a lack of qualified candidates constrained staffing (see Figure 3).

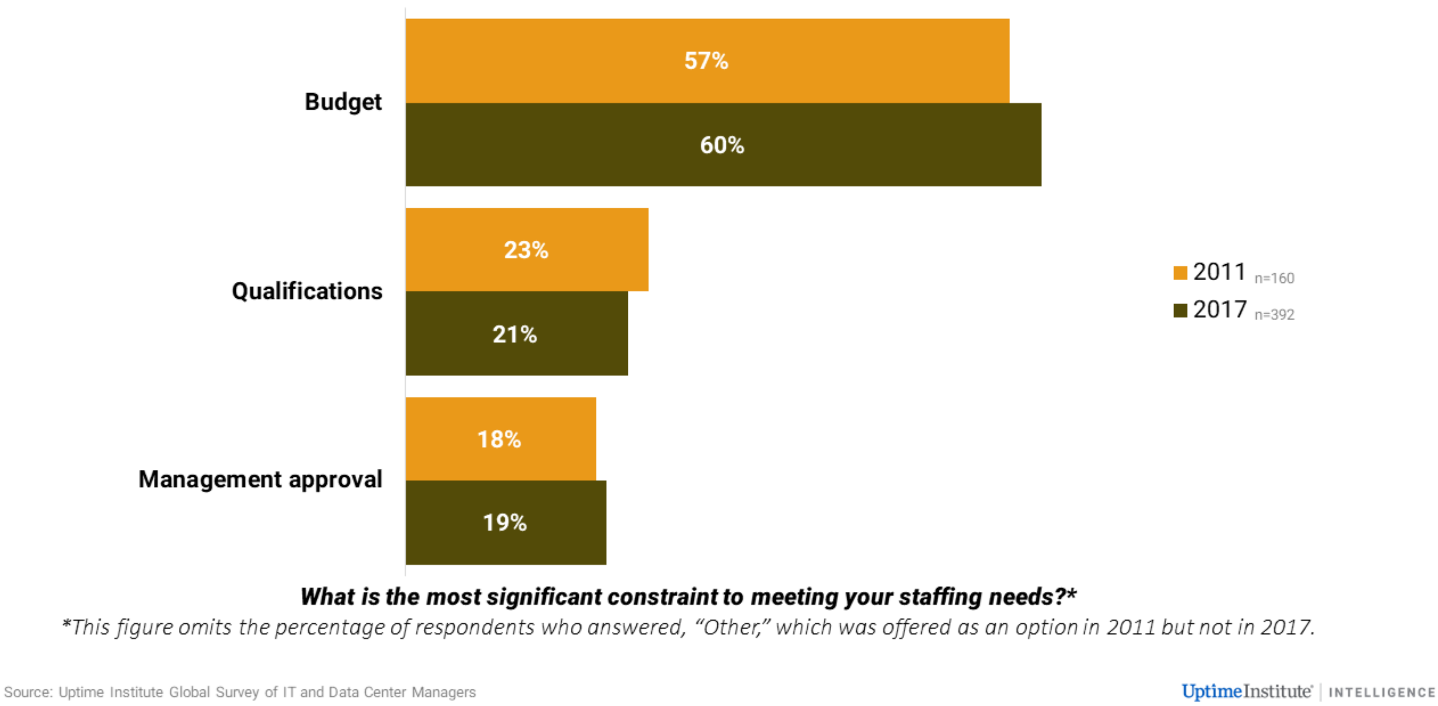

Figure 3. **Budget remains the primary barrier to adequate staffing**

These findings are consistent with interviews (see the **Appendix**) held with Uptime Institute Network members from a variety of companies in North America and Europe.

Despite these explanations, Uptime Institute's interview subjects agreed that skills and staffing shortages are real and suggested it may be particularly pronounced in labor markets that have one or more of the following characteristics:

- Qualified workers are scarce.
- Well-paying jobs are plentiful.
- Pay scales are low.
- Hyperscale operators have outsized compensation packages.
- Budget constraints or corporate or Human Resources (HR) policies inhibit the development of a succession program.

In some facilities, the lack of a succession plan for experienced staff is a significant problem, especially where many are due to retire around the same time.

Overall, Uptime Institute thinks the adaptive strategies adopted by many operators may have somewhat hidden or disguised the overall problem. Many data center operators have created action plans that help them cope with the skills and staffing shortages, limiting its impact to date. It remains to be seen how successful these "coping strategies" will be in a tight labor market.

Finding qualified workers

Most data center owners/operators insist that applicants have some level of relevant experience, and some do not hire entry-level workers at all. The relatively high qualifications required of even junior-level candidates means that many data center operators have cut themselves off from labor pools available to other employers, including high school and college graduates and individuals with experience in other types of work.

Data center owners and operators strongly prefer candidates with military experience (e.g., US Navy nuclear operations training), because service veterans come from a background in which following procedures is important. They also prefer individuals with mechanical/electrical licenses and construction experience, with many having worked as mechanical, electrical or plumbing contractors on a data center before joining an operations staff.

Our interview subjects mentioned other recruitment strategies, such as paying referral bonuses to employees who could recommend a qualified candidate and hiring from competitors and vendors, especially for more senior positions.

The strong preference for experienced candidates means that even entry-level workers have already completed short stints in other professions; some have logged enough service time to be collecting pensions when they are recruited. As a result, they are sometimes older than entry-level employees in other industries and have shorter career spans.

Uptime Institute does not have age data to support this reasoning, but with 56% of respondents to the 2018 Data Center Survey reporting 20 or more years of data center experience (see Figure 4), it is easy to extrapolate that the industry's workers are older than the US median (42 in 2016, according to the US Bureau of Labor Statistics).

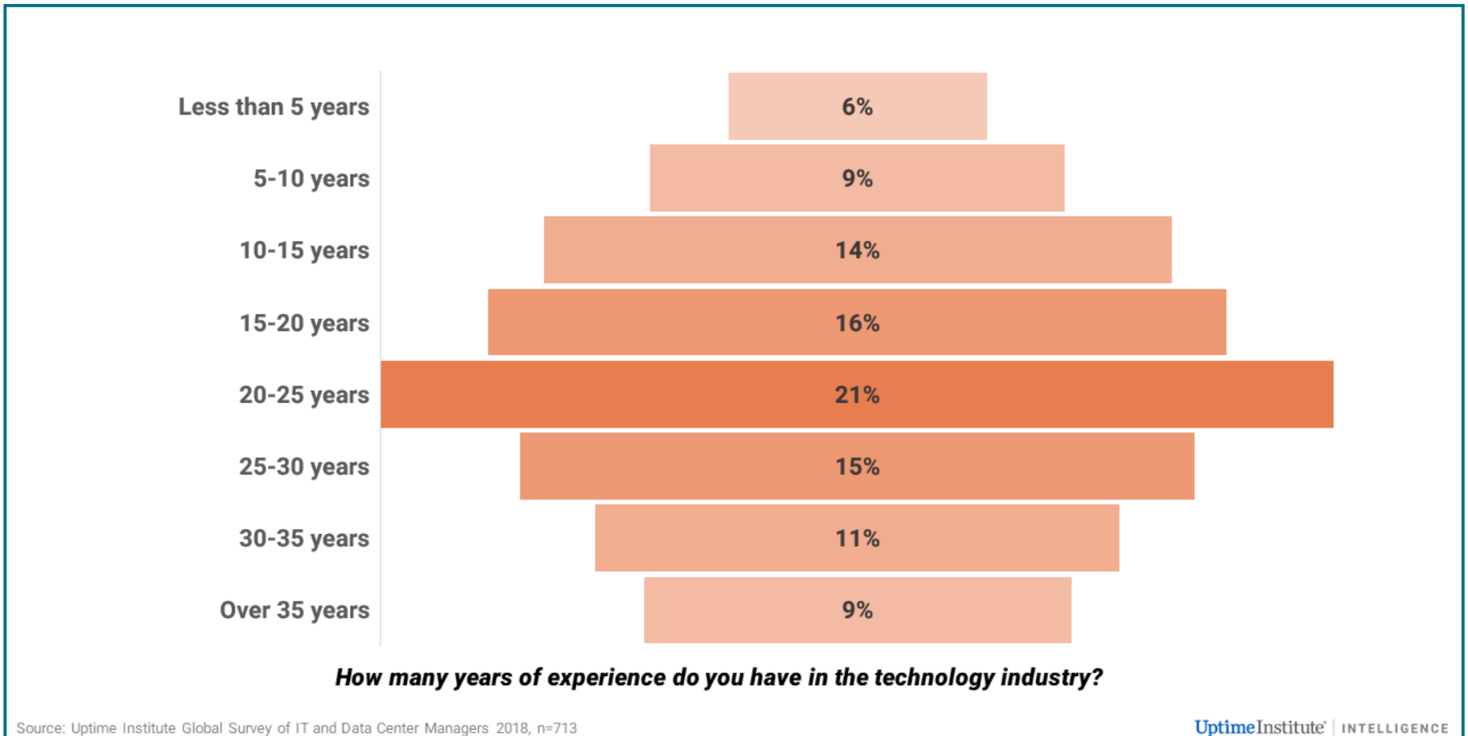

Figure 4. **More than half the workforce may be approaching retirement age**

Common threads

All our interview subjects agreed that the data center industry is experiencing a staff availability/skills shortage. Not all perceived the problem in the same way, but they did share a number of strategies for addressing the problem (see **Operator recommendations for attracting and retaining staff**), including improving compensation, using training to overcome the lack of qualified individuals, improving planning and using third-party services.

Not surprisingly, companies experiencing growth or rapid growth see the problem differently from those that are stable or retrenching. Hiring at growing companies is a constant, and turnover is a concern. At other companies, though, hiring is a less common occurrence, due to low turnover and little growth; here, finding even a few candidates for a position can be a challenge

Succession planning

For some of our interviewees, succession planning is critical to maintaining an adequate workforce at all levels of experience. These managers agree that their succession planning enables their organizations to transition smoothly in the wake of retirements or other changes in leadership.

Operator recommendations for attracting and retaining staff

Many organizations report difficulty finding and retaining qualified data center operations staff, even at the entry level. Replacing key personnel is a particular concern. Uptime Institute interviewed seven members of the Uptime Institute Network, all operating at least one large data center, and identified a number of strategies that can help with the recruiting/succession problem.

- Develop a staffing plan and rationale for staffing levels (see How to create and defend a budget for data center staffing). Such a plan will be essential to maintaining staffing levels in the face of proposed budget cuts.
- Develop a succession plan. Managers interviewed by Uptime Institute commonly suggested that in-house candidates can be the best source of replacement for retiring workers, but they must be sufficiently trained to take on new responsibilities.
- Budget for training at all levels to address succession concerns in advance.
- Conduct a top-to-bottom salary assessment. Managers interviewed by Uptime Institute were able to address staffing shortages in some departments when they determined that salaries were too low.
- Challenge current workers. Turnover is low in many data centers, making it difficult to keep staff motivated to develop new skills.
- Work closely with the HR department to develop appropriate job titles and recruiting channels. (NB: Uptime Institute's Staffing Taxonomy and Career Pathfinder will be published in the second half of 2019.)
- Broaden recruiting strategies. At least one company interviewed focused on military veterans to the exclusion of other channels. Other mission-critical industries can be sources of related expertise. Diversity efforts and programs can enlarge the pool of potential hires.
- Empower employees. Friends and family bonuses can help generate referrals from current staff. Liaise with and learn from your HR department.
- Coordinate with local colleges and universities. Supporting internships can be a way of attracting experienced "entry-level" employees.
- Make yourself aware of potential candidates working for vendors and third-party organizations. They already know your facility and at least some procedures.
- Raise the profile of your organization with colleges and high schools, veterans' organizations and community groups.

These succession plans anticipate personnel changes by encouraging the transmission of information and expertise from one level to the next, so that junior or less-experienced staff can be ready to take increasing levels of responsibility with time. However, some organizations do not fund the training necessary or allow time for mentoring.

Salary

In our operator interviews, two organizations were conducting a top-to-bottom salary review that would enable them to address staffing shortfalls in specific areas. In this area, as in others, facilities in growth industries had an advantage. The others often had to justify spending of almost any sort, making it hard to increase compensation to attract qualified people.

Competition

In certain geographical areas — and especially in data center hubs — workers are in high demand, which pushes up salaries. But high compensation alone is not enough to attract qualified staff. Employers need to be flexible and ready to address the range of priorities different workers may have in terms of independence, salary and benefits packages, etc.

One interview subject noted that hyperscale operators posed a difficult problem, as these companies might offer high salaries and/or compensation through options, with vesting dates and unmatchable growth. But as some recent fast-growing "unicorns" have shown, stock options in these companies can also be subject to rapid devaluation, damaging morale and making it easier for rivals to poach staff.

Localized shortages

While still important, salary can be a less of a concern for facilities in regions that lack an industrial base. Even in times of high unemployment, the lack of industrial and commercial projects in these areas means that few candidates have more than rudimentary skills. One manager who expressed concern about recruiting new staff operated a backup data center in a fairly isolated rural location in the US. He reported having a position that remained open for more than six months.

Hiring policies that hurt

Several interview subjects suggested that some corporate hiring restrictions reduce the pool of qualified workers. At least two of the owners/operators lost candidates that they deemed ideal for an open position but could not hire because of corporate requirements (often for education) unrelated to the job. One organization lost a good worker because a nearby facility could offer him a better position, despite his lack of a college degree.

In these companies, salaries, budget lines or minimum qualifications are set at a distance, leaving data center operators with the challenge of convincing HR that IT infrastructure has unique requirements and needs more specialized, experienced and higher-paid help.

Outsourcing: Pros and cons

In some organizations, the weakest links of the succession plan are at the most junior levels. In many organizations, these positions are filled by third-party vendors, with almost three-quarters (74%) of respondents to Uptime Institute's 2017 data center survey reporting that they outsource at least some facilities tasks (see Figure 5). The practice is so common that many data center operators do not even hire entry-level workers, shifting responsibilities for less experienced, lower-cost staff to third-party vendors.

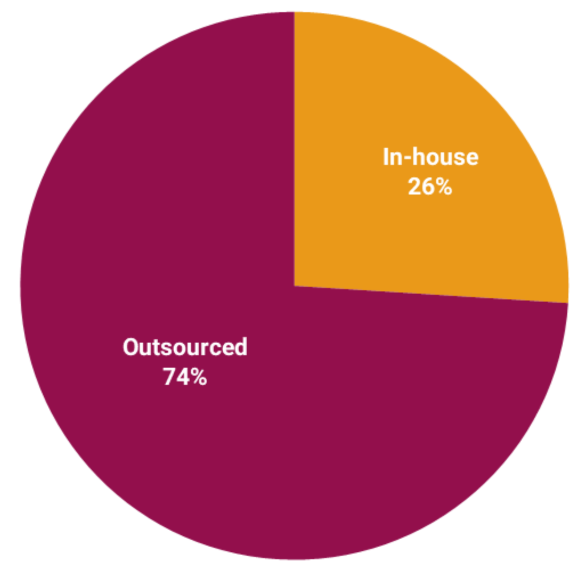

Figure 5. **High levels of facilities management outsourcing may hide a pool of potential workers**

This practice may make it harder for firms to identify qualified individuals for full-time staff vacancies, according to our interview subjects. For purposes of hiring at the entry level, our interviewees agree that they would prefer to have greater visibility into the performance of these contract workers, as the vendors are evaluated by their adherence to service level agreements (see Choosing a staffing strategy: in-house or vendor?).

Good management

Evidence from HR research has repeatedly presented a common finding: Staff who are happy will stay, will stay longer, and will resist the temptation of better offers elsewhere. And salary is very rarely at the top of a list of factors affecting job satisfaction. A supportive, appreciative, progressive manager who invests in staff development is far more likely to attract and retain staff than one who is less supportive.

The issue of staff shortages has been discussed at Uptime Institute Network members in the US, Europe and Asia, and the important of good management has come across forcibly. Many managers take pride in developing and supporting staff and have conveyed significant benefits to their organizations as a result.

Conclusions

- The data center industry faces a skills and staffing shortage.
- Staffing concerns are not new.
- Many data center operators have developed strategies to help blunt the impact of the labor/skills shortage.
- In some cases, corporate or HR policies and procedures have made the shortage more extreme.
- Planning for succession is an important first step.
- A stable workforce may actually be a detriment for some data center operators — the need to hire is infrequent, so they struggle when it is time to recruit.
- Retaining workers is a double-edged sword. Some operators value the ability to downsize workers almost instantly and scale up when work demands it. These companies thrive in competitive labor markets, where workers may prefer temporary positions that have higher salaries, even at the expense of benefits and security.

As in every other aspect of data center operations, management must understand the local market, offer competitive compensation packages, remain nimble, avoid erecting unnecessary impediments to hiring, and develop succession plans for each position.

Appendix: Interview Notes

Interview 1

SNAPSHOT	
Company revenues	$25-50 million
Individual interviewed	Datacenter Facilities/Datacenter Operations Manager
Industry	Colocation
Challenges faced	Budget development, scheduling difficulties, recruitment
Company offers	Training, advancement

This European-based colocation provider has reduced its facilities staff in recent years from 10 full-time employees to six. Strong demand for facilities personnel in the region has produced a job market in which qualified staff prefers to work short-term, high-wage contracts rather than permanent full-time employment. Low customer demand for management and operations (M&O) makes the organization reluctant to invest in higher staff levels.

Employees typically leave for a better position in the industry, such as at a vendor, supplier or service company or at a competitor's data center — but this is typical for the region. Many staff members prefer to be self-employed because they can charge a premium for their skills and they do not prioritize benefits. They often move on after six months or so.

There are advantages and disadvantages to this approach. This company would prefer to keep key personnel on payroll but acknowledges that having short-term employees makes it easier to reduce payroll when necessary.

The company has continuous vacancies, especially for data center operators, commissioning engineers for startups and building information modeling.

Existing staff have military backgrounds. The recruitment process is not very orchestrated.

They consider their recruitment process to be effective because the company is small and can allocate benefits for the right person.

Major consequence of low staffing levels

There is insufficient staff in the data center to perform M&O effectively; they are concentrating on maintenance. This is difficult to address because customers are not demanding M&O and do not realize the risk.

Interview 2

SNAPSHOT	
Company revenues	Greater than $500 million
Individual interviewed	Principal Engineer
Industry	Telecommunications
Challenges faced	Increased workload
Company offers	Training, advancement, referral benefit

Demand for services at this North American telecom provider has been unprecedented, both because of the growing number of customers and the services offered. The company has raised salaries and paid bonuses for successful references. The company's overall size enables it to field recruiters, who help the data center keep pace with hiring requirements. However, new education requirements have disqualified a few experienced candidates.

Fast growth means that this company is always hiring, especially mechanical and electrical engineers, and it is seeing a need for new skill sets. At the same time, though, many essential functions are filled by contractors, who must do their own recruiting and set their own wage scales.

Hiring for in-house staff is effective; the company hires from within and relies on employee references, especially for more experienced people. HR pays employees a referral benefit, which can be substantial for more senior hires.

Employees who "top out" in a field are given avenues to advance elsewhere in the company.

Major consequence of low staffing levels

The need for constant hiring and increased skill levels means that project teams include inexperienced members who can be "like a deer in the headlights" for the first two years. Everybody "wears a lot of hats."

Interview 3

SNAPSHOT	
Company revenues	Greater than $500 million
Individual interviewed	Vice President/Director of Operations
Industry	Colocation
Challenges faced	Budget development, retention program
Company offers	Training, advancement

This US-based colocation provider conducted a complete salary review about two years ago. The company was “bleeding people,” especially in security, network operations and M&O. Annual turnover has reduced to about 10% since the salary review. Even so, salary continues to be a reason that people leave, and they often go to rival colocation providers, other data centers, or other industries that value their experience or training.

That notwithstanding, the company seems able to not only maintain a stable workforce but also be selective when hiring — even given its strong preference for Navy veterans and requirement for somewhat higher qualifications than local competitors. It does so by aggressively recruiting within the military and by expanding its internship program. Its recruiting process is effective, and staffing levels are adequate.

Major consequence of low staffing levels

This company experienced a growth surge that ended about five years ago. Staffing levels have been stable and adequate in the last two years. The company makes job offers to about 70% of the candidates it sees.

Interview 4

SNAPSHOT	
Company revenues	Greater than $500 million
Individual interviewed	Senior Vice President and Manager of Data Center Strategy and Technology
Industry	Financial services
Challenges faced	Budget development, Increased workload, scheduling difficulties, increased need to re-cruit workers, need to "re-think efforts"
Company offers	Competitive salaries

This US-based financial-services company sometimes struggles to replace people, particularly at the higher experience levels. It recently determined that it needed to provide double-digit salary increases to recruit and retain quality security people. Despite the recent increases, the interviewee felt that salaries remain low.

The company's HR department helps with recruitment and has instituted the use of tools like LinkedIn. The recruiting process is considered adequate for less senior positions, but only marginally effective at more senior positions. The company does not hire entry-level positions; senior positions are often filled from outside. For example, a job vacancy opened in January 2019, but the next person in line was judged too inexperienced for the position. Senior-level openings are mostly due to retirements, but some individuals have left for better positions at competitors. In general, the data center staff turnover is low (two or three positions annually, but corporate IT support positions in India can have turnover as high as 15%.

Overall, most services are provided by large vendors on master contracts. Outsourcing works well for this company, but third-party service providers often chafe at procurement policies better suited for vendors.

Major consequence of low staffing levels

A confluence of factors means that this company can struggle with senior-level hires. The company depends heavily on third parties for its data center operations and does not hire at the entry level for most positions, which creates pressure to fill senior-level positions rapidly with outside personnel. However, relatively low turnover means that company does not regularly recruit for these positions. As a result, searches for senior-level positions can take longer than desired, which hampers knowledge transfer.

Interview 5

SNAPSHOT	
Company revenues	Greater than $500 million
Individual interviewed	Datacenter Facilities/Datacenter Operations Manager
Industry	Pharmaceutical
Challenges faced	Workload
Company offers	Good benefits package including tuition

This North America-based pharmaceutical/health-care organization relies on an aging cohort of workers who have been on-site since the facility opened 10 years ago. Many were older when hired and appreciated the stability and predictability of the work. Younger skilled technicians find it more lucrative to remain independent — an option made more feasible by the passage of the US Affordable Care Act. A low unemployment rate exacerbates the problem, as does the corporate pay scale, which limits salaries and makes it more difficult to compete with other employers.

The average age of the staff is around 57, with many hired from the construction team that built the facility 10 years ago. The company anticipates having to make multiple hires from what it considers to be a shrinking pool of qualified people, especially skilled craftsmen such as heating, ventilation and air conditioning (HVAC) mechanics and electricians. The local labor pool seems more interested in IT positions.

The company does not hire entry-level people.

To date, most new hires have resulted from word of mouth and recruiting from original equipment manufacturer vendors or from a nearby data center with a bad work environment. The average time to find a technician is longer than six months. Locally, experienced HVAC, electrical and industrial tradesman can make more money by remaining independent, but the company recently boosted overall pay scales by four to six percent in an effort to attract more candidates.

Major consequence of low staffing levels

Scheduling work is a challenge: two people must be on-site at all times to conduct normal operations. Additional or major projects must be scheduled in advance, which can be difficult.

Interview 6

SNAPSHOT	
Company revenues	Greater than $500 million
Individual interviewed	Senior Operations Manager Datacenter Facilities/Datacenter Operations
Industry	Telecommunications
Challenges faced	Workload, scheduling difficulties
Company offers	Consistent work hours

A corporate buyout 10 years ago drastically reduced staffing at this disaster recovery site for a North America-based telecommunications firm to below-adequate levels (from 22 to five, but that number has gradually increased to eight). Corporate management continues to play a major part in determining staffing levels. However, corporate management would grant permission for two specialty positions if suitable candidates could be found.

Turnover is steady, approximately one person per year (of the current eight staff members). Salary and job satisfaction are factors in workers' exit, as is retirement.

Most recent hires have come from external contractors working for the data center. The local economy does not produce many skilled technicians, and corporate offices have imposed strict limits on salaries and hiring. In some cases, staff has left for positions outside the industry and others now work for contractors at the site. Salary affects turnover, as does a general reluctance to work second and third shift.

Major consequence of low staffing levels

On-site staff has to contract out a lot of work that used to be done in-house. According to the interviewee, outsourcing is more expensive and results in less flexibility with regard to scheduling work. The inadequate staffing levels threatens reliability as well, as certain projects can only be scheduled during the day when shift coverage is higher.

Interview 7

SNAPSHOT	
Company revenues	Greater than $500 million
Individual interviewed	Senior Engineering Manager
Industry	Telecommunications
Challenges faced	Budget development, concerns about operational risk
Company offers	Advancement, internship program, leadership opportunities, work-life balance

This North America-based telecommunications firm is having trouble keeping pace with rapid growth. The interviewee has a free hand to recruit and is innovative in his approach. Salary competition from Amazon and similar companies makes it difficult for him to match compensation packages; however, a less-competitive work environment, combined with work-life balance, looks very attractive to many job candidates. In addition, company growth provides leadership opportunities for individuals looking to grow with the company. The data center often loses good people because they are promoted elsewhere in the company.

The recruiting process is fine, with lots of flexibility. However, the candidate pool is limited because a mature company cannot compete on compensation with rapidly growing internet concerns. In response, the company has developed pathways to personal growth, supports several diversity initiatives, and provides training to interns recruited from nearby colleges. People leave due to retirement but also because they have reached their peak in the company.

The company relies a great deal on vendors and suppliers for physical work, so it does not really encounter hiring challenges in these fields.

The interview subject finds that people want a progressive career path, with the potential for long-term growth.

Major consequence of low staffing levels

Inadequate staffing levels result from rapid growth in customers and service, with budgets growing in tandem. As a result, the company has developed diversity initiatives and internship programs to help keep pace. In addition, the company is developing a succession program to ensure that knowledge is not lost when individuals retire or move up the corporate ladder out of the data center.

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