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Introduction

The technological environment in which higher education institutions operate is changing. This is neither a novel observation nor a new phenomenon: The ever-accelerating pace of technological change has been observed for decades. What is new is the effect of technology and technological change on institutions of higher education. Technology has moved beyond traditional roles (e.g., server maintenance or network management) to serve as a foundation that underpins and furthers institutional missions of teaching, learning, and research.

The relationship of higher education institutions with technology is complex, and there are varying degrees of adoption. Some institutions are early adopters, while others are laggards to technology adoption, reflecting patterns that apply to individuals and groups at institutions of all types. However, regardless of the institution, the IT department must continuously lead in the adoption of IT to further the institutional mission and also communicate the value of IT. Traditionally, a central IT department was the owner and provider of IT across much or all of the campus. This model made sense when computing and networking were new and complex additions to campus operations. As software continues to “eat the world,” however, IT has become embedded in operations in every corner of the institution. There isn’t a campus unit that isn’t dependent in some way on IT services and support.

The “best” organizational model for delivering IT services in a given institution, at a given time, is fluid rather than set. Centralization may be right for some services, whereas a distributed model might make more sense for other services. While it may make sense to centralize a particular service now, that same service might be best delivered in a distributed model later. Service delivery models must assess value that the IT organization can provide to the institution at a given point in time for a given service.

The advent of new service models in the technology marketplace—in particular the cloud—has changed the way IT services are being provisioned. The IT department, once the major provider of technology to its campus, has become one service provider among many. This requires CIOs and other IT leaders to take a more strategic approach to IT deployment on campus and to IT’s relationships with campus stakeholders.

As a result, IT, which has traditionally been split dichotomously into central and distributed IT, is shifting to a more coordinated approach to its services. IT leaders are working to achieve a more deliberate understanding of the role that each part of IT plays and a clearer recognition of the need to be strategic, as well as secure, financially sound, scalable, and responsive to stakeholders. It is a move to a more intentional and harmonized IT ecosystem that brings together both central and distributed IT to best meet the institution’s overall needs.
It is time to replace the traditional view of IT as central versus distributed with a new model that focuses on IT in a more holistic way and positions IT in its new role as a collaborator and partner across campus. This paper explores the technological and organizational factors that are driving these changes and the strategic approaches that IT units are employing to meet them. We interviewed 11 higher education IT leaders—individuals in CIO, enterprise architecture, and other leadership roles—and asked about the advantages and disadvantages of a centralized versus a distributed approach to IT on campus, what trends they are seeing at their institution currently, and what their vision for the future of IT looks like. This report is informed throughout by these interviews and perspectives. In addition, throughout the paper we have included quotes taken from the interview discussions that help to provide additional understanding and real-world context.
Drivers

IT has become ubiquitous across all areas and functions of higher education, resulting in campus IT departments being asked to do more. At the same time, students, staff, and faculty are gaining familiarity and comfort with tools and technologies that have previously been the purview of IT departments. This leads to budget and purchasing decisions about new technologies being made within campus units independent of the IT department.

“What ultimately arises as a challenge is that the demand for IT services far exceeds the ability of central IT to meet that demand.”

The decline of a centralized-versus-distributed dichotomy used to organize and understand higher education IT is the product of the growing need to cooperate with, support, and rely on stakeholders beyond the boundaries of the traditional IT organization. Several technological and organizational factors are driving these changes; figure 1 represents the strongest of these drivers and their relationships.

Figure 1. Drivers of IT service delivery in higher education
Cloud

One of the fastest and most visible changes in enterprise IT services—both inside and outside higher education—is the move to the cloud. The cloud was one of the technology domains identified in ECAR’s 2016 report on the top 10 strategic technologies in higher education, and it was among those with the fastest pace of adoption. Figure 2 shows some recent EDUCAUSE research findings on the percentage of institutions of higher education that are making use of cloud services.

Figure 2. Percentage of institutions using various service delivery models
Cloud services such as e-mail, courseware, and data management tools enable higher education institutions to deploy enterprise-scale applications rapidly and on demand. The ease with which applications in the cloud can be deployed—in terms of both cost and technical staff expertise required—means that departments and even individuals can implement cloud solutions without consultation or coordination with central IT. However, doing so can—among other considerations—put the institution and its data at risk, as well as jeopardize economies of scale. As a result, institutions are moving to a more deliberate and strategic approach to cloud adoption, often starting with a defined cloud strategy for the institution, frequently backed by IT governance. This approach moves away from the “wild west” style of the early cloud days to a more mature understanding of what it means to be “in the cloud.” Essentially, IT shifts from being a direct provider to being a services broker, and while this doesn’t move “ownership” of the cloud solely to central IT, it does mean that distributed IT works more closely with central IT on cloud decisions to minimize risk and maximize benefits.

“There’s a saying, ‘Make small bets, find things that work, and then double-down on those.’ Adopting a cloud-first strategy is a doubling down, and a way of bringing innovation across the whole organization.”

This shift is made even more important when one reflects on how the move to the cloud changes IT staff responsibilities. No longer do IT staff need to build homegrown IT solutions or maintain tools in-house. Instead, IT staff need to consult with stakeholders on campus to understand their teaching and operational needs and objectives, then source IT solutions from vendors to meet those needs. In this services-broker model, IT staff evaluate the pros and cons of competing services, conduct risk assessments, manage legal compliance for data sharing, and negotiate contracts and agreements with vendors. It is important in this atmosphere to have close working relationships across IT as well as with campus stakeholders as a whole.
IT as a Service

IT work on campus has always been managed through a combination of centralized and distributed staff, some reporting to a central IT unit and some to individual academic units. The way services are provided has changed significantly, however, as the democratization of IT has increased not just in higher education but society-wide. Technology is a part of everyday life in a way it hasn’t been before, and users may hear about new tools and services long before IT units are prepared to support them. As a result, the IT department has shifted from being a technology provider to being a trusted advisor, a consultant of sorts that works with users to help them understand their options, weigh pros and cons, and make decisions about what tools will best support their needs.

“The risk is that if IT is not skilled in areas of needs assessment, integration services, selection, and deployment, the customer will just go it alone. And that’s the dissolution of IT.”

ECAR research on IT service delivery in higher education has found that CIOs believe that over the next decade their management focus will shift from “managing technical resources and infrastructure to managing vendors, services, and outsourced contracts,” as shown in figure 3.

Figure 3. CIOs are shifting their management focus
The increased use of outsourced solutions, especially cloud-based ones, is having a direct impact on the composition of the IT workforce. As noted in an early meeting of the ECAR IT Service Management Working Group, “IT is changing from being the builder of things to the integrator of things.” These changes may require new ways of thinking about how IT organizes itself. In fact, it is likely that the technological innovations that IT organizations manage are influencing changes to how services are delivered and units are composed; that is, technology not only enables the outsourcing of services but also makes possible cooperation and collaboration across institutions (e.g., via consortia) and within institutions across functional units.

The IT organization is not the gatekeeper of technology anymore. IT units need to take a consultative approach to delivering IT services to help campus stakeholders make decisions in their best interest and in the best interest of the institution. Relationships are more important than ever, both on and off campus. Product management, for instance, is very much about relationships, and staff with this responsibility bridge the divide between technologists, users, and vendors. That role—bringing people together—is one that will only expand.

**Strategic Alignment**

The changing service model is driven in part by a need for IT units to align more strategically with the institution’s mission. ECAR’s 2016 IT leadership survey found that slightly fewer than half of CIOs serve as members of their institution’s president’s or chancellor’s cabinet, and two-thirds of CIOs attend meetings of their institution’s board of regents or governors. As a partner, IT is more likely to have a seat at the table and enable CIOs to have significant influence in shaping the administrative and academic direction of the institution. The greater the understanding that the CIO and the IT workforce generally display regarding an institution’s business and strategic directions, the better the IT unit can serve the institution and the more trust campus leadership will have in the IT unit.

It is clear that CIOs are transitioning from an operational focus to a strategic focus. As stated in a 2015 joint EDUCAUSE/Jisc report, *Technology in Higher Education: Defining the Strategic Leader,* “[I]nstead of simply providing technology, the IT leader now helps determine future direction and provides understanding on how technology can best support both the business and academic sides of the institution.” The *Higher Education IT Workforce Landscape Report, 2016* further shows that CIOs spend a significant amount of time engaged in planning and innovation activities: 19% of their time on activities within the IT organization and 17% on activities related to business and academic units and governance bodies at the institution. Figure 4 presents additional EDUCAUSE data on how IT leaders—CIOs as well as other IT managers—spend their time.
Serving as a member of the president’s or chancellor’s cabinet provides a CIO with a great opportunity to influence institutional decision making and direction, and it signals how highly the president or chancellor values the CIO’s input into this planning. As was noted in the article “Building a Common Technology Vision,” “EDUCAUSE data indicate that CIOs who are members of the cabinet are more likely to engage in discussions about institutional decisions and help shape administrative and academic directions.” However, the article is quick to point out that, for IT leaders who aren’t cabinet members (approximately half), “cabinet membership is not a deal breaker” and “Ultimately, the org chart is less important than making sure that technology is a part of strategic discussions and decisions.”

As part of this shift, there is an increased awareness that an effective IT leader is one who can build relationships, be seen as a trusted advisor, and communicate the value of IT to a broad range of constituents. In this environment, then, success in areas such as learning analytics increasingly means sharing responsibility and indeed partnering with functional areas. In addition, the

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**Figure 4. Percentage of time CIOs and managers spend on various activities**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percentage of Respondents Agreeing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managing IT operations and services</td>
<td>100%</td>
</tr>
<tr>
<td>Planning and innovation within the IT organization</td>
<td>75%</td>
</tr>
<tr>
<td>Planning and innovation with business and academic units and governance bodies</td>
<td>50%</td>
</tr>
<tr>
<td>HR/staffing, including staff professional development</td>
<td>25%</td>
</tr>
<tr>
<td>Serving the IT profession</td>
<td>0%</td>
</tr>
<tr>
<td>Other</td>
<td>0%</td>
</tr>
</tbody>
</table>

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“IT is going to continue to change. This is a fork in the road for us. One path is that IT will become essential but not strategic, like lighting or A/C. The other path is where IT is fully recognized as a strategic weapon and leadership identifies core ways to use IT. This is the difference between a CIO and a director of computing.”
increased use of technologies throughout higher education necessitates a greater focus on integration and agility. This calls for stronger collaboration with distributed IT and at the same time an awareness of the need for shared ownership of IT to better serve users.

However, this strategic partnership is realized, IT must become not just infrastructure but a resource for the institution. Faculty and administration must bring IT into planning discussions early in the process and be willing to call on IT when problems arise. The alternative is for IT to be perceived as essential but not strategic.

**Data and Analytics**

The advent of new computing technologies, expanded storage capabilities, and new ways to gather and analyze data has brought new attention and value to institutional data. In particular, analytics will help institutions make better-informed decisions and proactively support students and their success.\(^{15}\) With analytics, however, there is also increased need to know the source of the data, to protect and secure the data,\(^{16}\) and to make sure that governance is in place to guide how data are used and by whom.\(^{17}\) As shown in figure 5, this need has been coupled with a need for data (and data platforms) to be more tightly integrated across the institution, particularly as data not only come from sources outside the institution but may also be stored off premises or with service providers.\(^{18}\) In many cases IT is a conduit for technology, building the pipelines to companies that can support core services and making sure that data are secure. As noted in *The Predictive Learning Analytics Revolution: Leveraging Learning Data for Student Success*, data collection and predictive learning analytics “require the collection and analysis of unprecedentedly large data sets stored in centralized systems that contain confidential information about individual students,”\(^{19}\) raising key questions around data privacy and security.
ECAR research on Integrated Planning and Advising for Student Success (iPASS)\textsuperscript{20} identified the need to include stakeholders, especially end users, in conversations about the implementation of and support for student success technologies.\textsuperscript{21} EDUCAUSE has observed similar patterns of cross-organizational cooperation and partnership in prior work on business and learning analytics. One of the key recommendations that The Analytics Landscape in Higher Education, 2015 report offered was that IT organizations need to “embrace collaboration,” because the issue requires “a collaborative sensibility involving interaction and mutual support among leadership, IT, institutional research, and functional departments, both administrative and academic.”\textsuperscript{22} While IT is not currently a major consumer of business analytics, it is a key stakeholder in providing the infrastructure and talent to support these practices.\textsuperscript{23}
But, despite—or perhaps because of—the number of users and creators of data, higher education leaders realize the importance of making sure that essential enterprise data are available and integrated across numerous different systems. The move to the cloud has sharpened the focus on the need to unbundle certain historic information systems, extract the data layer into a more neutral zone, and bring multiple providers together into one common data hub.

“Some things are critically important. We see many of our functional departments buying services from cloud vendors and putting data out there, and we are asking if they are aware of the potential risks. We see a role for consultative data services for IT.”

As higher education makes progress in this area, each institution will need to decide for itself—preferably through established data governance—when central IT needs to have control and what systems can be managed by distributed IT. The decision typically revolves around sensitive data, system interfaces, how the institution values data aggregation, financial implications, compatibility, and end-user experience. The average user won't necessarily know what data are sensitive, so by centralizing management of these systems, institutions can ensure that access to data is determined through an established, central process. But establishing such a process requires an IT background and an understanding of business needs.

Realistically, the future of IT will likely be a blend of on-premises versus off-premises services, with data spread out in many places. That brings risk and security concerns, as well as multiple versions of the data needing management. In this environment, IT is expected to take on an increasing consultant-like role. Hiring outside consultants is typically very expensive and usually temporary, despite a long-term need. This is where central IT can play a role providing consultant-like skills and resources on a more regular (and more affordable) basis, while helping others to see the value that IT brings.
IT Funding

The 2015 ECAR working group report Aligning IT Funding Models to the Pace of Technology Change: Enabling Financial Flexibility for Core, Flexible, and Transformative Services notes that “the role of technology in higher education has undergone a metamorphosis, but the budget processes at many institutions have largely remained the same. At a time when IT needs to be agile and flexible, financial resources are often stringently allocated and unavailable to assist institutions in transformational work.” But, as the service model for IT units shifts, the funding model for IT units has also begun to shift in order to allow for the flexibility needed to support these new service models. These shifts occur within the framework of the culture of higher education, however—a culture in which funding cuts have been more of a rule than an exception.

“Ultimately, conversations about IT turn to funding. Who should fund what? Should central IT fund all the technology changes, or none? The answer lies somewhere in between because it’s no longer a question of central versus distributed IT; it’s evolving toward more of a partnership.”

Campus units can be very protective of their budgets in this environment. At large, complex institutions, units such as business schools may be large enough and have the resources (in funding and staff) to manage their own IT. On the other hand, small institutions and units with fewer resources may have to rely on central IT. A critical question for both central IT units and the campus units with whom they are working is, who pays for what? As noted in the 2015 ECAR report Calculating the Costs of Distributed IT Staff and Applications, “Understanding the distributed IT landscape can facilitate communication and coordination across campus IT delivery sites. Campus IT partners can help identify opportunities for cooperation, standardization, and service improvement. Campuses can work toward responding to IT demand, budget, and cost pressures in a unified way.”

Technologies such as e-mail and learning management systems (LMSs) are typically deployed at enterprise scale and are therefore maintained—and paid for—by a central IT unit. But where a campus unit has specific requirements that may not be widely shared across campus, there is room for negotiation.
Effect of Drivers

Thus far this discussion has been about the change drivers, both technological and social—forces that in isolation and in combination are changing the environment in which higher education IT units operate. Now let us discuss the effects that these drivers have on IT units and on the institutions they serve.

A Shared-Ownership Model

One of these effects is so powerful that not only is it driving IT units and institutions, but it also drove the creation of this very report. As many technologies become simpler and less expensive to deploy (particularly if they’re cloud based), the “traditional” model of a strong central IT unit on campus is increasingly under threat. The question is, which technologies should be deployed by a central IT unit and which are better deployed by distributed IT in campus units?

The technology deployed on campus is often a mix of these two. The EDUCAUSE 2015 Core Data Service annual survey reports annually on which functions are conducted by central or distributed IT or elsewhere (see table 1). Higher education IT is now a hybrid of centralized and distributed, with pockets of IT all around the institution.

Table 1. Central and distributed IT services

<table>
<thead>
<tr>
<th>IT Services Most Commonly Shared with Central IT and Another Department</th>
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<tbody>
<tr>
<td>Analytics</td>
</tr>
<tr>
<td>Content design and web-based publication</td>
</tr>
<tr>
<td>E-learning</td>
</tr>
<tr>
<td>Educational technology services</td>
</tr>
<tr>
<td>Research computing services</td>
</tr>
<tr>
<td>IT support services</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IT Services for Which Distributed IT Most Commonly Has Primary Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institutional research</td>
</tr>
<tr>
<td>Library</td>
</tr>
<tr>
<td>Analytics</td>
</tr>
<tr>
<td>E-learning</td>
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</tbody>
</table>
On the one hand, the advantage to having technology on campus managed by a central IT unit is that there is a single point of contact, one locus of responsibility, one budget, and associated economies of scale. On the other hand, the advantage to having technology on campus managed by distributed units is that it is more customizable: The technical and support requirements of a history department, for example, will differ from those of a chemistry department. To meet the needs of individual units at an institution, it is important to have some distribution of labor across local IT units. Every institution must identify a balance of power between these units that works well and makes sense for the local culture.

“I like having people distributed, to meet local needs. I think that it is the only way that I’ve come up with in which I can provide a reality check to the desires. Otherwise I spend a lot of time on governance and decision making, and nobody is happy.”

A shift is occurring toward a shared-ownership model that will use the best features of central and distributed IT. A shared-ownership model allows central IT to be responsible for core commodity services while relinquishing certain other responsibilities. In this model there is an intersection of the local business process and IT, where central IT administers the core infrastructure while many deployments and management are outsourced to distributed IT. Central IT may still do a lot of work on behalf of distributed IT units—and is still held accountable for enterprise-wide IT—but the distributed partners are the ones who know about specialized needs and therefore are in charge of the local processes. This model enables diverse management for IT—something that is essential for complex institutions and that positions IT as an institutional partner. It signals a change in how IT works, i.e., that IT is here to enable campus partners and support innovation.

Central IT units have unique capabilities and expertise but insufficient resources or time to manage each IT project on campus. By developing common values, having open discussions, and developing trust, IT can do more and be more strategic in its support across the entire institution.

**Divesting**

In her *EDUCAUSE Review* article “Top 10 IT Issues, 2016: Divest, Reinvest, and Differentiate,” Susan Grajek, EDUCAUSE vice president for Data, Research, and Analytics, argues that “to make room for a new set of practices—a new infrastructure—we need to divest ourselves of today’s practices.” She further points out that “many colleges and universities have moved or are moving beyond the question of whether to run their own infrastructure and applications in the presence of reliable, effective, and up-to-date external solutions.”

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As the demand for IT services increases—and in some cases may exceed the ability of IT units to meet that demand—it makes sense for IT to divest some services. Some things are critical to retain; what these things are will depend on the institution and its future directions. But it also depends on what the future role of IT will be. Ultimately, though, IT organizations will identify certain things that they shouldn’t be doing, perhaps because others can do them better. Some may be easy to identify—discussion lists, custom e-mail forwarding services, campus file servers, support for deprecated versions of software, local data centers, etc.—while others may entail more difficult decisions. It may be hard to stop doing things, but it’s unwise to try to keep doing everything. That isn’t a strategy. It takes a dedicated effort to determine what to keep doing, where IT units can best support the institution, and what is better divested.

The availability of cloud services significantly enables this divestment, allowing central IT units to move away from developing and maintaining technologies such as e-mail, the LMS, and even data centers on premises; thus the role of the central IT unit shifts to vendor relationship management. In some cases a particular campus unit has a competency or a relationship with a provider and wants to manage the vendor relationship or will want to use a different system. It will be up to each institution to weigh the risks and benefits of allowing units to manage such relationships in place of central IT.

Divestment, of course, carries risks. The largest of these is security, particularly if the responsibility for securing information and data assets lies with the owner of those assets rather than the CIO. A dean or department chair, for instance, will be less likely to be able to provide assurances of security. There are often concerns, too, about the security of the cloud. Ultimately though, moving to the cloud alone doesn’t always mean more work; the increase in work often is more the result of a faster pace of implementation and adoption—a shift of work requiring different rather than fewer skill sets.

Other risks include potential inefficiencies, missing out on economies of scale, and the possibility of poor user experience or user support. The challenge and the risk to the institution arise when a department chair or dean takes on IT work without all the necessary capabilities: knowing whom to hire, how to secure the technology, and how to maintain consistency with the broader ecosystem.
of technologies, applications, and institutional data. Determining whether providing a service centrally versus in a distributed fashion has advantages that outweigh any risks is a decision that must be made deliberately and in consultation with IT and other stakeholders.

As services are divested, it is important for the IT unit to be closely integrated into the institution’s core business and strategic plan. Otherwise, the risk is that the administration may lose sight of the IT unit’s function in maintaining relationships with the vendors providing services. It is also an opportunity to understand what role IT will be playing on campus. Will IT simply be a provider, or does the divestment of some existing services allow IT to become more strategic, serving as a partner and advisor in a way that more closely aligns IT with the institution’s mission?

**IT as Trusted Advisor and Partner**

Ultimately, the biggest change is in how IT is perceived—and how IT presents itself—on campus. The drivers are working together to shift IT’s role from technical support provider to trusted advisor and partner across the institution. In this role, IT understands the core business of the institution, provides expertise to integrate across the campus and advance strategic directions, and spends less time focusing on wires and switches and more time building relationships and communicating about how IT can help.

> “The more you understand the business of higher education and the business of your institution, the better you are—more of a trusted advisor. If you can demonstrate an understanding of this, they will take you more seriously. You will have more credibility, and they will listen.”

As a partner, IT not only provides services to users but also helps users understand what is the IT organization’s and what is the users’ responsibility to make sure that IT is safe, secure, and supports the institution. Importantly, though, this cannot be done by central IT alone. Central and distributed IT need to work together to build a sense of community across the organization and to set standards of service and accountability that everyone must observe. The IT organization as a whole then becomes a campus resource that protects users and units on campus, addresses concerns about the user experience, and removes barriers to IT.
Conclusion

The IT function has always been a balancing act between central IT and distributed IT units around campus. What is important is not the degree of centralization or decentralization, or even how different institutions orchestrate these units. What is important is the set of factors driving centralization or decentralization, the decisions campus leadership makes about these drivers, and the effect of those decisions on the IT organization. Ultimately, the conversation should be about the value that the IT organization as a whole can provide to the institution: the value of technology and the value of relationships.

Some of this value lies in providing mission-critical functionality. Many enterprise systems fall into this category: Wi-Fi must be available, e-mail must be delivered, and courseware must be reliable. All of these provide value to the institution, but they’re so ubiquitous that often they’re invisible to users—unless they fail. Additional value lies in providing specialized tools and technology unique to one specific academic unit, office, lab, or even project. IT units must maintain relationships across campus so that when specialized needs arise, these departments, offices, or labs involve IT in the process of selecting, deploying, and applying technology. Finally, value also lies in data collected by enterprise systems (such as the registration system) and data collected by researchers.

IT units are in a unique position on campus to serve as caretakers of these data, which may be useful to accrediting bodies and other campus units and stakeholders.

Technology is increasingly mission-critical and integrated into all aspects of campus operations. Consequently, higher education IT must increasingly be partners with campus leadership, involved in and informing strategic decisions. The IT organization is a caretaker, managing technology locally on campus as well as remotely in the cloud. It is a negotiator, acting as an intermediary between campus units and technology service providers. It is an integrator, bringing diverse technologies together to add value to the institution and the units within it. It is also continuously evolving, and as technologies and the landscape of commercially available services change, the IT organization must change along with them.
Acknowledgments

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Notes


4. For instance, individual and departmental adoption of cloud services may also make it more difficult to clearly track IT expenses, so that an institutions doesn’t have a full awareness of its IT costs. In addition, if individual faculty select different cloud tools for their teaching, this could make it more difficult for students, who then need to be conversant with multiple platforms across their courses in order to do their work—making IT more of a hindrance than a help.

5. For more about developing a cloud strategy, see the following ECAR papers: Cloud Strategy for Higher Education: Building a Common Solution, Preparing the IT Organization for the Cloud: An Introduction, Preparing the IT Organization for the Cloud: Developing Cloud-Aware Governance, and Preparing the IT Organization for the Cloud: Transforming the IT Organization.

6. Technology in Higher Education: Defining the Strategic Leader, research report (Jisc and EDUCAUSE, March 2015).


8. The ECAR working group paper Preparing the IT Organization for the Cloud: Transforming the IT Organization goes into detail about “some of the core and evolving roles that should be considered as part of a cloud-centric IT matrix organization.”

9. ECAR-ITSM working group; from 1/28/16 call. For more information about this working group, visit http://www.educause.edu/ecar/ecar-working-groups/it-services-and-management

10. See IT Leadership Survey 2016.


13. Ibid.


16. For more on this topic, see Michael Fary et al., *Data Protection Primer for Higher Education: Environmental Considerations, Culture, and Practices*, ECAR working group paper (Louisville, CO: ECAR, June 2016).

17. To learn more about the importance of data governance, see the following ECAR working group papers: Douglas Blair et al., *The Compelling Case for Data Governance*, ECAR working group paper (Louisville, CO: ECAR, March 2015), and *Establishing Data Stewardship Models*, ECAR working group paper (Louisville, CO: ECAR, December 2015).


20. Beginning in 2016, this acronym replaces the original acronym, Integrated Planning and Advising Services (IPAS).


25. Pam Arroway et al., *Calculating the Costs of Distributed IT Staff and Applications* (Louisville, CO: ECAR, August 20, 2015).

26. EDUCAUSE Core Data Service 2015 survey. In addition, the ECAR working group paper *Calculating the Costs of Distributed IT Staff and Applications* provides additional insight into distributed IT data. In January 2016, EDUCAUSE launched the EDUCAUSE Benchmarking Service. This service helps CIOs and other campus leaders measure progress on campus-wide strategic initiatives. Starting in 2017, institutions will be able to assess and benchmark their IT service management maturity through the EDUCAUSE Benchmarking Service.