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WHITE PAPER SERIES

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Cloud computing means locating your enterprise systems and data on the internet. The benefits have already been demonstrated across a variety of industries, including higher education. But how do you determine the return on investment your particular institution will achieve if and when you make the move? Using traditional methods to calculate the ROI can present an incomplete result, omitting valuable benefits to your institution's move to the cloud.

In this paper, we provide a framework for assessing the costs and benefits of transitioning to the cloud—one that will help you make informed decisions, reduce risks, and have meaningful conversations about ROI with key stakeholders.

Calculating ROI in the cloud

It is possible to assess your return on investment for cloud services. Because making decisions based on data is increasingly important to higher education, a solid understanding of cloud ROI can be a powerful tool.

This paper explores the potential return on investment for organizations that fully deploy their enterprise resource planning (ERP) systems to the cloud.

Determining a meaningful ROI requires considering the full range of variables that constitute both costs and benefits. It also requires defining a time period over which to chart those variables. As more institutions report data and share it with their peers, there is a better understanding of the performance indicators most useful for calculating ROI.

Why traditional ROI models fall short

ROI calculations typically define the payback of investments against the benefits to the business using financial terms and variables that are fairly static. These calculations fall short when used in the more complex, constantly evolving world of cloud computing. Deployment models vary, and options change frequently and can break traditional ROI models, leaving potential benefits unaccounted for.

It's easier to set the right metrics for calculating the ROI of a subscription-based student recruiting service, for example, than it is to determine the right metrics for an enterprise-wide administrative system. The recruiting service's cost is relatively fixed with value measured against the number of students enrolled, whereas the value of an administrative system is spread in nuanced ways institution-wide.

Simply put, benefits extend beyond IT, changing the way functional areas conduct and approach business.

Understanding costs and benefits

Costs

To establish the baseline costs of your institution's "current state" enterprise application environment, we recommend looking at four key areas: datacenter infrastructure, licensing, labor, and training.

Datacenter infrastructure

Consider:

- Server hardware
- Network hardware
- Hardware and network maintenance
- Power for servers
- Power for HVAC/utilities
- Facilities (rent/opportunity cost, batteries, physical security)
- Primary data storage
- Data backup, archive, retention, and off-site storage
- Infrastructure costs such as load balancers, firewalls, routers/switches, data replication appliances, etc.
- System security and monitoring equipment

For each element, determine cost per unit and its useful life (in years) in order to calculate an annualized cost per unit. You then have a reasonable "current state" calculation to use as a base for comparison against any "future state" cost savings.

Licensing

Consider:

- Operating system licenses
- Database licenses
- Licensing on elements such as virtualization, monitoring software, security software, patch management, IT service management software for ticket management, and VPN software, etc.

Identify the cost per unit and its useful life (in years) in order to calculate an annualized cost per unit. We suggest calculating a five-year maintenance horizon as a working base.

Labor

Consider:

- Application management
- Database management
- Operating system administration
- Infrastructure server administration
- After-hours support
- Security monitoring, investigation, and mitigation
- Maintenance and testing of disaster recovery plans
- Consulting labor for projects such as technology refresh

Application and database management
Identify the costs of these supporting activities. Typical duties for application and database managers include performing updates and upgrades, monitoring and troubleshooting systems, performance management, capacity planning, and documentation. In our experience, one full-time employee can usually handle up to 10 database servers.

Operating system administration
Typical duties for operating system administrators include system installation, hardening, tuning, backup and recovery, monitoring critical systems and services, troubleshooting, upgrades and patches, and security duties. In our experience, one full-time employee can usually handle up to 50 operating systems.

Infrastructure server administration
Typical duties for infrastructure server administrators include installation and configuration of new software and updates, network maintenance including firewalls, updating user account information, and performing backups. In our experience, one full-time employee can usually manage 30 servers.

After-hours support
Typical duties include 24/7 monitoring, triage, incident management, and escalation. Many, but not all, of these duties have been automated in recent years. Because it does not require a full-time employee, we suggest calculating this cost in hours and assigning an average labor cost.

Security monitoring, investigation, and mitigation
Typical duties include 24/7 monitoring, triage, incident management, and escalation. Many, but not all, of these duties have been automated in recent years, and the labor is variable based on the architecture of the environment. It will also be influenced by changes in regulations and incidents that may occur. Because it does not require a full-time employee, we suggest calculating this cost in hours based upon historical institutional data and/or the industry average probability of incidents occurring and assigning an average labor cost.

Maintenance and testing of disaster recovery plans
Typical duties include scoping, architecting, procuring, installing, provisioning, maintaining and testing backup and disaster recovery (DR) systems. Most institutions undertake a comprehensive DR test every year, and the costs can vary depending on whether you have internal resources to devote to this task or need to hire consulting help. We suggest calculating this cost in hours and assigning a fairly significant labor

cost since these tasks are typically performed by highly skilled individuals at the expense of other tasks being performed.

Technology refresh

Typical duties include scoping, architecting, procuring, installing, provisioning, and testing new systems. Most institutions undertake a comprehensive technology refresh every three years, and the costs can vary depending on whether you have internal resources to devote to this task or need to hire consulting help. We suggest calculating this cost in hours and assigning a fairly significant labor cost since these tasks are typically performed by highly skilled individuals.

Training

Consider:

- Application
- Database
- Operating system/network
- Infrastructure
- Security

While not every institution invests in formal training for technical staff, we suggest including classroom costs in your total, so you can benchmark the price of keeping staff current—whether through formal training, onboarding programs, or on-the-job training. Costs of training are not only the hard costs for registration and travel, but also soft cost in terms of "opportunity cost."

Costs: summary

In general, understanding your current state costs—the total cost of ownership of the systems and applications you are considering moving to the cloud—is critical to estimating the potential return. The elements discussed above provide the starting point for this analysis.

Benefits

Quantifying the benefits of a technology environment—whether on-site or in the cloud—is a difficult proposition. But it can be done. We recommend examining the benefits your technology investments deliver through two discrete lenses.

- **Total cost reduction:** This is closely linked to the total cost of ownership (outlined above). You can lower your total cost of ownership by reducing what the institution is spending on IT today as well as repurposing existing investments. For purposes of this paper, the next question to ask is: by adopting cloud services, which infrastructure, licensing, labor, and training costs can you trim or eliminate altogether? Affixing a monetary value to these costs is relatively straightforward once you've identified the cost elements of each. We'll walk through an example later in this paper.
- **Cost avoidance/value-added benefits:** This second lens is critical to understanding the full benefit derived from moving to the cloud. You can avoid costs and gain value-added

benefits, by examining how the solution can enhance normal operating capabilities your institution has today or plans to add in the future. You probably hear cloud vendors speak in general terms about these types of benefits, citing increased reliability, reduced risk, easier scalability and agility, and the ability to focus more resources on mission-critical priorities. But how do you measure these benefits?

Assessing value-added benefits

Ellucian has identified seven value-added benefits you'll gain from moving to the cloud. Working with our many customers to aggregate and understand the relevant data, we have assigned clear metrics to each benefit.

1. **Value of reduced downtime:** To calculate, we look at more than the number of hours the application is unavailable. We also evaluate the number of total application users, concurrent application users, average hourly compensation, and the percentage of downtime that affects those users over the course of year. With this information, we arrive at a dollar figure for lost productivity due to downtime.

2. **Value of improved performance:** Taking into consideration the number of users and associated labor costs, we measure those costs against application requests per user per hour (to calculate how many times per hour a user is affected by slow performance) and system latency (to calculate cumulative latency per hour per user). With this information, we arrive at a dollar figure for lost productivity due to poor performance.

3. **Value of fewer security incidents or data losses:** Even one security breach can have a significant effect on your institution's reputation and financial health. We measure this by calculating an average incident cost per customer record and multiplying that by the probability of a security incident.

4. **Value of application currency:** While maintenance costs for on-premise enterprise applications are significant, those maintenance dollars deliver good value—upgrades, updates, patches, support, and more. As you calculate the value of application currency, also remember to look at the speed at which new upgrades and updates can be applied. Improved currency means fewer institutional resources involved in lengthy and cumbersome upgrades.

5. **Value of more efficient backups:** To calculate this value, we again use the number of users and associated labor costs, and evaluate those numbers against hours of lost work product due to inefficient backups.

6. **Value of better disaster recovery:** The number of users, associated labor costs, and probability of a disaster in a given year are taken into part of the calculation. We also look at metrics such as time to recovery and cost per disaster due to lost productivity. Finally, we look at how a loss in reputation disturbs revenue. We do this by calculating the percentage of students who leave your institution as a direct result of a bad experience.

7. **Value of improved student experience:** Providing students a good technology experience is a top goal of the IT department. But how do we measure the value of these experiences? We look at the ways improved availability, performance, security, and scalability help increase satisfaction among stakeholders across your institution. We then use that "satisfaction index" to calculate the percentage increase in satisfaction needed to improve student retention by 1 percent. We can assign a dollar figure to that increase because improving student retention boosts total revenues from tuition.

ROI in action

To illustrate all of the metrics we've just described, let's take a look at a hypothetical sample institution with the following attributes:

Student headcount: 5,890

Faculty/staff headcount: 337

Number of user licenses: 100

Average student tuition: $11,500

Duration of analysis: 5 years

Employee salary burden rate: 33 percent

Average salary and benefits: $93,100

First, we calculate total cost of ownership for an enterprise system that supports our hypothetical institution. Let's use datacenter infrastructure costs as our example.

This sample institution is currently spending $113,045 annually to maintain hardware and server infrastructure. Reducing infrastructure costs, of course, is a key reason to move to the cloud. Here, the institution realizes a total reduction in datacenter infrastructure costs of $105,845—achieved by eliminating most hardware costs and reducing system and data backup and off-siting costs by 50 percent. This is a conservative estimate that assumes the institution has additional systems on-premise that it has chosen not to move to the cloud.

Table 1. TCO reduction: datacenter infrastructure

			Annual cost per unit			As is (client management on-premise)		To be (proposed solution)	
Annual datacenter/ infrastructure	Unit name	Key assumptions	Cost per unit	Useful life (yrs.)	Annualized cost per unit	Units	Annual cost	Units	Annual cost
Server hardware	Servers	Std size server	$5,000	5	$1,667	16	$26,672	0	$0
Network hardware	Servers	20% of server costs	$1,000	3	$333	16	$5,328	0	$0
Hardware & network maintenance	Servers	20% of server and n/w costs	$1,200	1	$1,200	16	$19,200	0	$0
Power for servers	Servers	$342 per year per server	$342	1	$342	16	$5,472	0	$0
Power for HVAC/utilities	Servers	$854 per year per server	$854	1	$854	16	$13,664	0	$0
Facilities (including UPS, rack, maintenance)	Servers	$300 per year per server	$300	NA	$300	16	$4,800	0	$0
Storage	GBs	SAN costs + maintenance	$70,528	3	$23,509	1	$23,509	0	$0
Systems & data backup and offsite storage	GBs	100 MB per user per month	$1,000	12	$1,200	12	$14,400	6	$7,200
Total							**$113,045**		**$7,200**

This sample institution reduces data infrastructure costs by $105,845 by eliminating most hardware costs and reducing data backup and off-siting costs by 50 percent.

Labor costs

It's clear we expect to reduce infrastructure costs, so let's turn now to total cost reductions for labor.

Table 2. TCO reduction: labor

				As is (client management on-premise)		To be (proposed solution)	
Annual application administration	**Includes**	**Unit name**	**Cost per unit**	**Units**	**Annual cost**	**Units**	**Annual cost**
Application management	Performing updates/upgrades, monitoring, troubleshooting, performance management, capacity planning, documentation	Hrs. per month	$48	369	$212,544	52	$2,496
Database management	Performing updates/upgrades, monitoring, troubleshooting, performance management, capacity planning, documentation	Hrs. per month	$48	18	$10,368	0	—
Explanations: One person can handle about 10 DB servers.							
OS administration	Installation, hardening, tuning, backup and recovery, critical systems/services/logs monitoring, troubleshooting, upgrades and patches, security admins	Hrs. per year	$48	832	$39,936	0	—
Explanations: One person can handle about 50 operating systems.							
Infrastructure/ server administration	Management of all infrastructure above	Servers/ FTE	30	0.5	$46,550	0	—
Explanations: One person can handle a network of about 30 servers including backup, firewall, etc. "Cost per unit" is actually servers managed per full-time employee. "Units" is the number of FTEs required to manage the servers in the first table above (based on "servers/FTE" ratio). Annual cost is FTEs x FTE salary.							
After-hours support	After-hours support/24x7 monitoring triage, incident management, escalation	Hrs. per year	$48	148	$7,104	52	$2,496
Technology refresh labor	Scope, architect, procure, install, provision and test new systems	Hrs. per year	$48	20	$960	0	—
Total					**$317,462**		**$4,992**

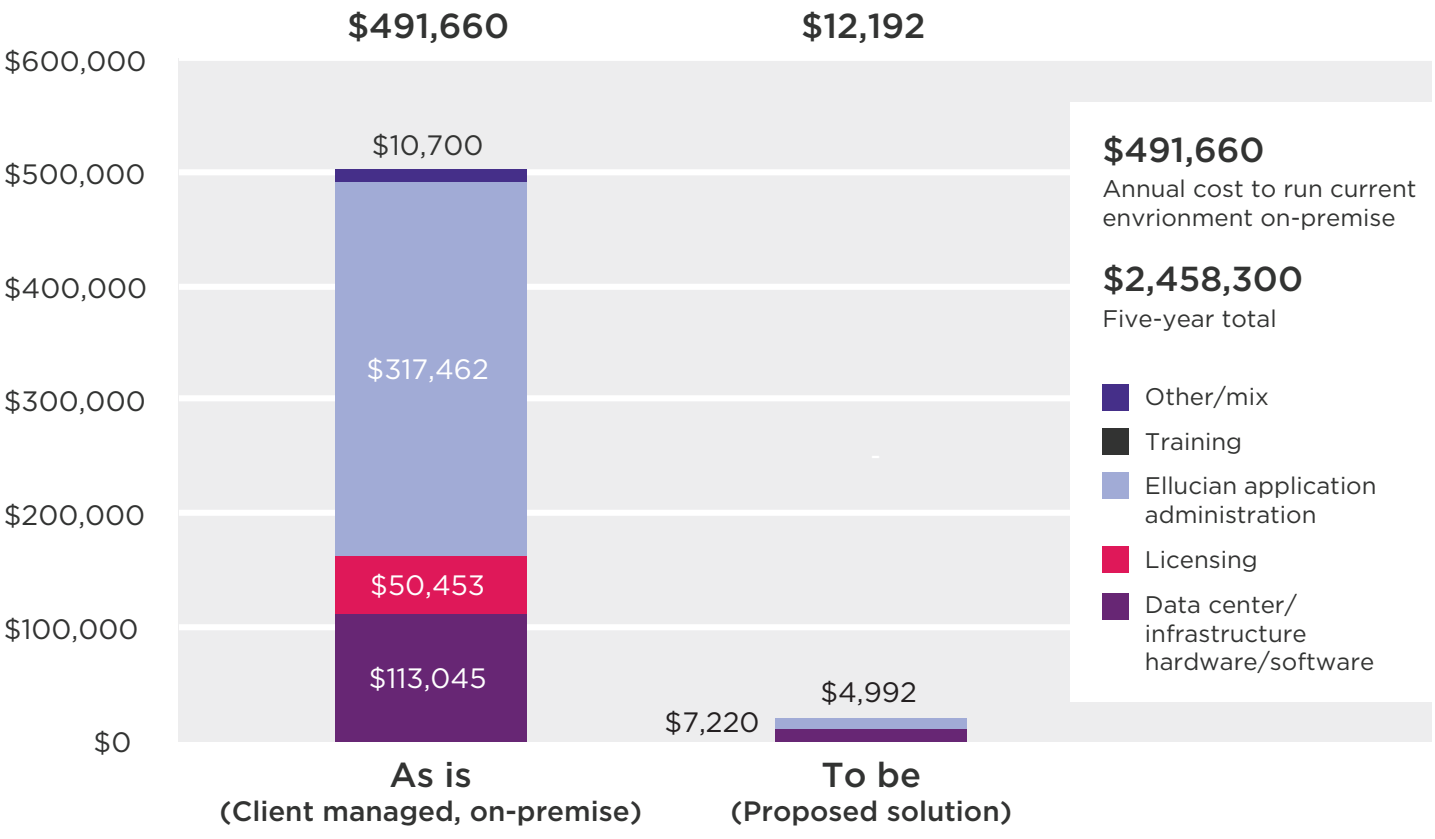
Using the same sample system in Table 1, the institution could save $312,470 in annual labor costs by moving its ERP system to the cloud.

The total cost reduction for labor can be considerable. Labor costs vary greatly by region; in some urban areas such as New York City, Washington, D.C., Atlanta, Seattle, the Bay Area, Southern California, and Boston, these costs will be higher. While in rural areas, finding talent rather than paying for it may be the primary concern. To maintain the system outlined in our example, the institution is spending $317,462 annually in salary and benefits. By moving the ERP system to the cloud, costs are reduced by $312,470 annually.

When we apply the same analysis to the remaining key areas, the total cost reduction realized by moving from a self-managed and on-premise enterprise system is quite clear:

But, as referenced previously, we also want to capture the value-added benefits for a comprehensive representation of the solution's real return on investment.

Table 3. Ellucian application annual TCO
(not including application, licensing, or other fees)



In a cloud computing future state (with proposed solutions), the sample institution reduces costs by $479,468.

Downtime costs

As we did with total cost reduction, let's look at two examples more closely to examine the value of lost productivity due to downtime.

By gathering salary and benefit information, including burden rate, we can calculate the average hourly wage (in this example, $48/hour) for a typical ERP user. We also aggregate enough data to estimate application downtime in the current state scenario (113.9 hours) as compared to the future state scenario (26.3 hours). In this example, we do not assume downtime affects all users equally. Rather, our scenario shows that only three quarters (75 percent) of the users would be affected.

Still, application downtime has a dramatic impact once those hours are multiplied across the 75 users affected. An annual loss of 57 hours/user results in a concurrent loss of $205,200 in labor. Bringing those annual lost hours down to a more reasonable 13.2 hours/user brings that cost down to $47,520. This institution, in other words, can realize $157,680 in value-added benefits by keeping its staff as productive as possible.

Table 4. Value-added benefit: avoid downtime-related lost staff productivity

KPI	Description	As is	To be
User labor costs	Average hourly compensation	$48	$48
Application users		100	100
Concurrent users as % of total users		75%	75%
Concurrent users		75.0	75.0
Application downtime %		1.3%	0.3%
Application downtime total	Hours per year	113.9	26.3
% of application downtime impacting users		50%	50%
Hours of application downtime	Hours per year per user	57	13.2
Staff downtime	Lost productivity (downtime x concurrent users) hours	4,275	1,117
Downtime	Downtime hours x hourly rate	$205,200	$47,520
Benefit			**$157,680**

In this example, labor costs, the number of concurrent users, and other key performance indicators (KPI) help quantify the cost of ERP downtime in both on-premise (as-is) and cloud-based (to-be) scenarios.

Disaster recovery

Let's walk through one more value-added benefit: improved disaster recovery.

Recovering from a system-wide failure can be a huge burden for an institution whose primary responsibility is educating students, not maintaining a hardened data center. In our analysis, we look at the value of avoiding such a disaster, as well as recovering quickly and efficiently.

We've found that our example institution can take up to 45 days to recover from a site-level disaster.

In a cloud environment, where technical expertise combines with hardened data centers, a return to normal is expected within two days. That has a significant effect on productivity—as you can see from Table 4.

But we also need to measure the damage a prolonged recovery can have on reputation. In Table 4, we identified lost tuition from students who did not return as a way to measure reputation cost. Even a conservative estimate of a 1 percent tuition loss amounts to over $3 million for our sample institution.

Table 5. Value-added benefit: lower cost of disaster recovery

KPI	Description	As is	To be
User labor costs	Average hourly compensation	$48	$48
Number of users		100	100
Probability of a disaster in a given year	(The to-be is less than 1% due to data center design)	5%	0.1%
Time to recovery from a site level disaster	(Assume only 33 normal business days impacted)	45	2
Cost per disaster due to lost productivity		$1,267,200	$76,800
Cost per disaster due to reputation impact	Impact on revenue—equivalent of a % of students lost per 10 days of non availability of systems due to reputational/student sat rist	1%	1%
Average revenue per student		$11,500	$11,500
Revenue lost due to a disaster		$3,048,075	$135,470
Cost of disaster recovery per year		$215,763	$212
Annualized benefit			**$215,551**

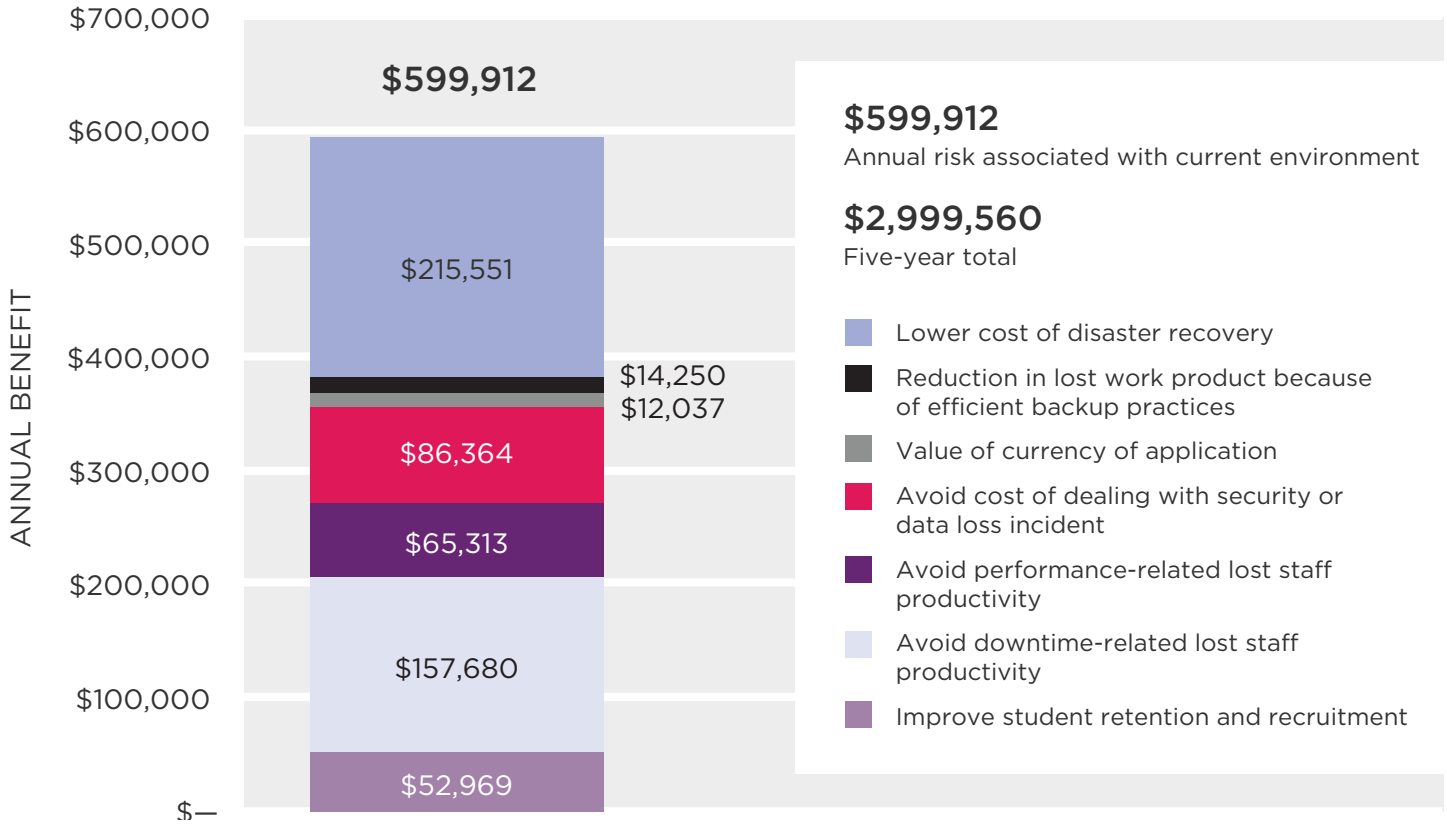
In a cloud environment, responsive technical expertise helps accelerate disaster recovery to minimize downtime and productivity loss. In this example, an institution would see an annualized benefit of $215,551 and save more than $4.1 million in the case of a single disaster.

Value-added benefits: summary

The value gained by moving from a self-managed and on-premise enterprise system to the cloud can be captured and easily visualized.

When your primary mission is education, you cannot afford to overlook value-added benefits. By applying a dollar figure to these benefits, you get a clear picture of their importance to your overall return on investment.

Table 6. Risk avoidance and value-added benefits



From disaster recovery to lost productivity, our sample institution could significantly reduce risk by operating in a cloud environment.

Conclusion

Five years ago, we did not understand the benefits that a move to the cloud could offer higher education. As a result, institutions were unable to make informed decisions about a possible transition. Today, we are better equipped to calculate total cost of ownership, understand how to reduce those costs, and measure, with a high degree of confidence, the value-added benefits that a cloud ERP deployment can offer.

While the cloud is by no means cost-free, we are now able to have a meaningful discussion about costs and benefits. And we suspect that's why we're seeing an increase in the adoption of cloud computing across the field of higher education.

For more information or for an ROI analysis personalized for your institution please visit www.ellucian.com/Services/Ellucian-Cloud-Services.

About Ellucian

Ellucian helps education institutions thrive in an open and dynamic world. We deliver a broad portfolio of technology solutions, developed in collaboration with a global education community, and provide strategic guidance to help education institutions of all kinds navigate change, achieve greater transparency, and drive efficiencies.

More than 2,400 institutions in 40 countries around the world look to Ellucian for the ideas and insights that will move education forward, helping people everywhere discover their futures through learning.

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