



# TECH TACTICS

## Campus Imperative: An Enterprise Cloud Infrastructure for Cost Savings and Innovation

Your institution already trusts the on-premises infrastructure provider to maintain a secure, high-performing and reliable environment for running the enterprise applications. Why not take that work to their data centers where they can do an even better job?

**A**S COLLEGES AND UNIVERSITIES PREPARE FOR re-entry that requires a mixed environment — some people on campus and others off — the IT organization faces an age-old problem: greater demand for services with the same or even diminished budget. Institutions don't know how many students will be returning in the fall, whether face-to-face or remote. They're still sorting out what state funding they might receive. The pressure is on to make sure the customer experience for members of the campus community will be as efficient and engaging as possible, so business — whether that's new enrollments, new hires, new donors or new research projects — isn't lost to the institutional competitor down the road or across the country.

These are the kinds of drivers that call into question the notion of doing business as usual. But, where do you start? Plenty of energy has gone into achieving “quick wins,” such as those activities related to adoption of videoconferencing to continue teaching and learning, securing mobile devices and strengthening the virtual private network for work-anywhere. Those efforts have been essential to continuance of operations.

Now, it's time to tackle the challenging work of re-examining how the institution runs its mission-critical applications. Updating legacy programs — financials, HR, student systems — is where substantive transformation occurs. When it's done right, the results free up dollars, improve performance and strengthen overall security at



a new level of success.

Cloud infrastructure is at the heart of the solution, according to Jim Zemaitis, group vice president in charge of higher education technology at Oracle. “Our team is investing heavily in our customers — we’re doing analyses and modeling of their current architecture, infrastructure, application portfolios and costs, and then comparing that to what’s now available in the cloud. In short, if customers are open to a different operating model — no longer having to run all their operations independently — in exchange for moving to cloud, the value is clearly there,” he observed.

## Leapfrogging Cloud Early Adopters

Nearly every institution has already invested in the cloud, if only to the extent of adopting software-as-a-service. However, with each increasing phase of cloud commitment, the benefits grow, suggested Mary Olson, Oracle director of higher education & research program strategy. Colleges reap “more infrastructure elasticity, security becomes more reliable and robust, and staff can focus on the mission of the institution rather than the duties of keeping the lights on,” as she put it.

With a cloud infrastructure as the foundation, colleges and universities can begin to add additional cloud services that set the institution up for future growth. For instance, many universities are finding that

digital assistants such as chatbots can reduce staff time by having routine questions answered to meet the needs of prospective students, current students and staff. And using cloud analytics helps campus leaders gain insights into trends, from student success metrics to more mundane physical infrastructure costs such as heating and cooling.

No stranger to cloud operations, higher ed IT organizations have matured enough in their cloud work to undertake a reevaluation of options that goes beyond simply choosing on-premise versus cloud. What they’re doing now is figuring out how to select the *right* cloud for their workloads. Increasingly, they’re finding that experienced, large-scale cloud vendors provide innovations, advantages and value that leave the more traditional — predictable — cloud choices far behind.

Fortunately, colleges and universities considering cloud infrastructure today can leapfrog early adopters and take advantage of second-generation cloud to get built-in advantages unheard of in prior offerings. As a leading example, Oracle Cloud Infrastructure incorporates tighter security; faster performance; autonomous services for self-repair and self-optimizing; and tools for easier migration.

Building an enterprise-level cloud infrastructure services is the foundation for current and future needs. But it’s important to remember that not all clouds are the same. The following guidance will steer you right.

# 10 Essential Do's and Don'ts of Building Cloud Infrastructure

Start your cloud migration plan here with these expert tips.



## 1. DO undertake a validation exercise and cost analysis.

This is the best way to determine whether or not your infrastructure is better suited to remain in place. As Zemaitis explained, institutions can

work with his team to develop models that incorporate all the mainstay items that people are paying for today. That work is undertaken at no cost and entails Oracle's enterprise cloud architects and business value experts using a methodology comparing current business-as-usual expenditures to the proposed cloud environment.

"We take three areas into account: financial, architectural and operational," he stated. "The models are pretty straightforward, and they're relatively conservative." The goal isn't just to determine whether there's a cost savings. It's also to identify where there could be improvements in services.

At the end of that exercise, customers receive an executive summary that lays out the current infrastructure investment against the potential savings

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and value-proposition areas that they can realize. "In almost every case, when we do these analyses for customers, the cost from going on-prem to cloud is either the same or less — usually less — and they always get a lot more value," Zemaitis said. "Then it's up to the customer to say, 'We should move forward' or 'We should stay with what we've got.'"



## 2. DO take into account how your chosen cloud infrastructure will improve security.

Cloud vendors are highly motivated to continually focus on security, Olson

asserted. "Otherwise, it's their death sentence." She said she believes cloud is "more secure than ever and organizations can bake in better security than they have in their own datacenters."

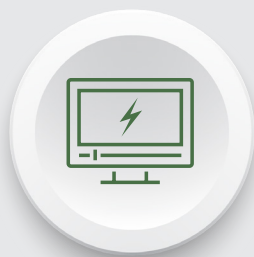
Take, for example, the budget strain of putting on-premise systems through rigorous security testing. "IT decision-makers are challenged to prioritize funding among three areas: operations, modernization investments and security," she noted. "Frequently, security bears the brunt of cuts. Are you putting your on-premise data center security through the same paces that a cloud service provider puts theirs through in terms of third-party security compliance audits, vulnerability assessments and staying current with patches? Often, the answer is no."

Also, colleges and universities should be augmenting their security efforts with artificial intelligence, machine learning, automated analytics and autonomous capabilities. "This enables institutions to address threats in real time, making it possible to keep up with the attackers, where humans simply could not," Olson said. "If you're undergoing a denial-of-service attack or something along those lines, patches can be applied for you as your application is running so you're not behind on the patching —because it's autonomous. If you're trying to fight the bad guys with humans when they're attacking you with robots, you're unlikely to win. You need to have



robots fighting robots. That's where autonomous comes in, and that's not offered in all clouds."

Olson's advice: "Make sure your cloud service provider has the right security for your unique use case and the certifications to prove it."



### 3. DO consider how technology choices influence reputation management.

Another area where the latest cloud infrastructure excels is encryption, a function that can have far-reaching results.

"There are third-party organizations out there that will try to articulate a cost per record breach inside many industries. While the numbers fluctuate, over a number of years we've seen it north of \$200 per record for a data breach in higher ed," Zemaitis explained. "If you don't have encryption today, and you count up the total number of students, faculty, staff and records that you keep on the existing population and extrapolate that across all your years, those numbers can be absolutely staggering."

The outlay is "very real," he added. There's the expense of doing forensics, setting up call centers, performing credit watches and sending mailings. "And those are only the direct costs," he noted. "There's also an indirect cost of the impact on the reputation of the institution, the impact to who comes and does research at your institution, who's actually going to give you an endowment."

With that in mind, Zemaitis advised, "There's tremendous security breach avoidance — and cost avoidance — if you can incorporate encryption as a baseline." Oracle Cloud Infrastructure invokes encryption automatically. He compared it to flipping on a light switch: "Either you have it or you don't. With us you have it. Every customer gets that because it's a requirement."



### 4. DO assess the tooling available to move and manage cloud workloads.

Not all clouds are architected the same, nor do they come with the same features and functions. "It's not just a matter of having your



## Notes from the Field: Northern Illinois University

This 17,000-student institution had come to a junction for supporting its critical PeopleSoft application. It was time to replace the Exadata servers, either by updating on-premise hardware, exercising the school's Cloud@Customer option, performing a DIY VMware deployment or moving the application to the cloud. Cloud won out.

In a recent **webinar**, Manager of Database Services Ruperto Herrera laid out what drove the decision:

**Reducing costs.** As Herrera noted, cloud eliminated the need to replace hardware every few years. "By choosing Oracle Cloud, we were able to save 13% on infrastructure-related costs over a three-year period," he said. "We're very happy [with] that number."

**Improving reliability and scalability.** The university wanted improved performance, availability and protection from DDoS attacks. "Being able to scale up during times of peak load, such as during student registration periods or finals, was a priority for us," Herrera said. "Bare metal gives us the flexibility to scale ... in a very seamless manner, which we've already done a number of times without any issues."

**Streamlining IT operations.** The shift of critical administrative systems to the cloud freed up on-premise resources. And OCI's cloud automation tools allowed the university's IT team to simplify maintenance and patching processes. Herrera credited Oracle Consulting Services for putting together realistic design blueprints and cost estimates for running NIU's workloads in the cloud as part of the validation exercise. "We're still well within those limits today," he said.

**Also useful:** OCS' help in steering the architecture away from a recreation of what was on premise. "It took us a little while to let go of that and trust our partner," he noted. "[But] adopting best practices [will put us] a better position to manage our environment in the long run."

workload running in somebody else's data center," Olson said. "You have to consider what tooling that cloud provides that is going to add value to the move and to help you do migrations, manage workloads and analyze cloud operations."

In addition to a wealth of built-in tools — services free to every customer — Oracle Cloud Infrastructure is backed up by a robust marketplace with third-party applications, tools and services that can work together with the cloud service provider.

"Think of an app store," Olson offered. "The more open the standards, the more accessible the services for innovation and transformations that keep your investments current and keep them from becoming legacy — essentially future-proofing your investment."



## 5. DO exploit the advantage of cloud for campus analytics.

Much of the analytics work that takes place on campus is discrete — siloed by application, whether that's the LMS, SIS or

student success system. And for good reason, Zemaitis suggested. "One of the previous barriers to data warehousing and analytics that people were afraid of — and rightfully so — was that if you created this environment and gave it to your line-of-business users and it became successful, guess what? They'd want more and more. When it comes to data integration, typically, if it's successful, it grows exponentially." As a result, a lot of

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institutions may be reluctant to create that environment in the first place because of a fear of staffing and supporting that environment.

For those reasons, Zemaitis said, **Oracle's Autonomous Data Warehouse (ADW)** has become a "gamechanger." As he explained, ADW, available as a service in the Oracle public cloud, integrates systems and data stores, whether they're in clouds or on-prem, eliminating the complexities of operating a data warehouse, securing data and developing data-driven applications.

"The service automates provisioning, configuring, securing, tuning, scaling and backing up of the data warehouse and includes tools for self-service data loading, data transformations, business models, automatic insights and built-in converged database capabilities that enable simpler queries across multiple data types and machine learning analysis," he noted. "It lets schools deploy analytics without having to fear creating a monster."

This is an area where the Oracle cloud offerings excel, he emphasized. "Yes, you can use analytics for budgeting and forecasting and planning. But you can also do analytics for student retention and attraction — looking at all facets of that student's interaction and lifecycle within the institution to make sure they're being successful: If the campus is open, are they going to classes? Are they passing classes? Are they showing up to eat in the cafeterias? Are they accessing the buildings late at night and early in the morning?"

ADW is a natural outgrowth for a data company "that already underlies the mission-critical applications running on campus," Zemaitis pointed out. "If we're already doing that, why wouldn't you proceed with having Oracle play a bigger role in your cloud plans and free up those resources and dollars for other purposes?"



## 6. DON'T hand the work off to someone who can't serve as sponsor.

If there's one lesson Zemaitis has learned in his decades of working with colleges and universities, it's that C-level

oversight is essential for success in cloud infrastructure projects.

When schools are undergoing validation exercises, as an example, the CIO and CFO need to be part of the discussions "because, at the end of the day, it's about undertaking an enterprise-class change," he noted. "After all, we're talking about business-critical applications that run the institution on premise today and moving those to a different environment."

For those reasons, Zemaitis advised, the CIO or equivalent role should minimally serve as a sponsor for the exercise, with application, technical architecture and database administrator leads serving as part of the customer account team that would work jointly in conjunction with the cloud provider.



## 7. DON'T push off attention to data quality.

As your operations shift to the cloud, so will some, much or all of the data. Olson recommended that colleges and universities

clean up the data prior to replatforming — “or you’re going to take a lot of your issues and just move it to a different set of servers.”

By moving “good data” into the new system, institutions will be better positioned to take advantage of the analytics capabilities of their cloud infrastructure. Plus, users will put more faith in the information they’re working with. This is important as institutions progress to a data-driven culture focused on outcomes tied to student success, internal efficiencies and enhanced cybersecurity.

Of course, any cloud-driven data quality initiative will require articulating “who owns the data, how it will be managed and where it will be stored, as well as developing a plan to recover the data at the end of the contract and determining whether you’ll incur egress fees or be notified if it’s moved,” Olson said.



## 8. DON'T discount the use of cloud infrastructure for disaster recovery and business continuity.

A common theme for enhancing operations by moving to cloud infrastructure

is gaining higher availability, faster performance and true disaster recovery (DR). Cloud provides a low-cost insurance policy against disasters.

“We’ll see a lot of institutions that either don’t have a DR plan today or have a very limited DR plan,” said Zemaitis. “Once we go to the cloud, we can not only have redundancy within the cloud data center but across cloud data centers, so it’s a much more robust environment that exists there than they would have on premise today.”

The advantage for cloud is that it can be geographically dispersed and easy-to-scale, reducing downtime as campuses increase their reliance on digital services. In the event of a major emergency, students will still be able to access critical services from wherever



## Oracle's Solutions

Oracle Cloud Infrastructure consists of dozens of individual cloud services that address 10 essential kinds of operations:

- **Analytics and big data:**  
Oracle Analytics Cloud
- **Application development:**  
Container Engine for Kubernetes
- **Applied software technologies:**  
AI and blockchain
- **Compute:**  
Bare Metal Compute  
Oracle Cloud VMware Solution
- **Database management:**  
Autonomous Data Warehouse  
Exadata Cloud Service
- **Integration:**  
Oracle Integration
- **Observability and management:**  
Application Performance Monitoring  
IT Analytics  
IT Infrastructure Monitoring
- **Networking, connectivity and edge services:**  
Virtual Cloud Network
- **Security, identity and compliance:**  
Identity and Access Management  
Identity Cloud Service
- **Storage:**  
Data Transfer  
File Storage  
Object Storage

they're located, continuing their education and maintaining contact with the institution.

As Olson pointed out, institutions no longer require "brick and mortar datacenters with heavy compute, network and storage gear" for their DR sites. What's required now is "a file with some code of a few kilobytes that you can run in case of any contingency and dynamically spin up an entire datacenter — on the fly. You don't have to pay a significant cost to keep your entire DR setup up and running all the time."



## 9. DON'T underestimate how cloud choice affects staffing and skill sets.

One aspect of the validation exercise will be to determine whether the institution

is "change-hearty," as Olson suggested. That means its people and processes are ready to undertake an enterprise-level infrastructure transformation.

Overseeing services on cloud infrastructure requires a different set of skills for IT people from running on-premise systems. Make sure your team members have opportunities to expand their skills into new areas:

- Integration architecture
- Container knowledge
- Enterprise cloud migration
- Cloud performance testing
- Autonomous database
- Cloud security
- Storage services

Oracle University now offers numerous learning paths, with many free courses for helping crew members get up-to-speed:

- **Autonomous Database Specialist**
- **Cloud Infrastructure Foundations Associate**
- **Cloud Infrastructure Cloud Operations Associate**
- **Cloud Infrastructure Developer Associate**
- **Cloud Infrastructure Architect Associate**
- **Cloud Infrastructure Architect Professional**



## 10. DON'T rely on a single cloud provider to answer all of your needs.

As with most things in life, it's important to diversify to reduce risk and maximize value. "Multi-cloud represents

the future of cloud computing, and for obvious reasons," Olson explained. "Organizations that adopt multi-cloud strategies can design applications to run across any public cloud platform and spread their risk in case of downtime."

Similarly, achieving a positive cloud migration requires prioritizing the order of transformation, and that encompasses figuring out where critical workloads "run best — whether that be on premise, in the cloud or in a hybrid environment," she added. "Technologies that run the same on premise as in the cloud — allowing workloads to be ported back and forth if needed — provide for maximum flexibility."

## Higher Performance, Lower Cost

Ultimately, the decision to invest in an enterprise-grade cloud requires understanding all the benefits it delivers and doing a rigorous comparison against what IT is currently providing, how well those solutions will scale and what it costs for all of that to work.

"Institutions are constantly being tasked with delivering more student, faculty and staff services to remain competitive and stay at the forefront of their industry. At the same time, there has been uncertain revenue and budget pressures," said Zemaitis. "The move to cloud offers the greatest potential opportunity to provide these services and do so at the same or lower price points."

A well-laid cloud infrastructure can also support and make room for transformational technology adoption on campus, such as research computing, artificial intelligence and blockchain.

As for the choice of cloud provider, Zemaitis pointed out, "you're already trusting your infrastructure provider today to provide a secure, performant and reliable environment. Why not trust them to do so at one of their data centers where they can do an even better job?"

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