



# Cloud enclave for academic research

Streamlining security and compliance at your institution

August 2021

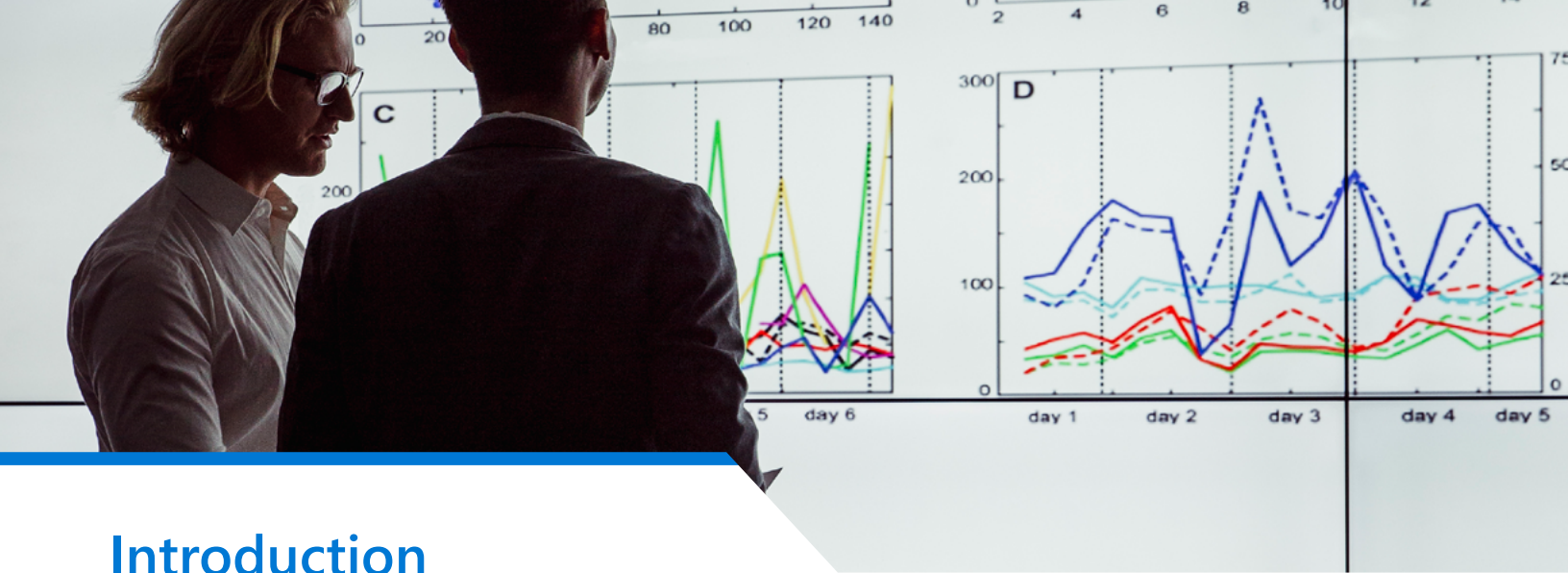


# Contents

---

<b>Introduction .....</b>	<b>3</b>
<b>1. Assess where you are today .....</b>	<b>4</b>
Work directly with researchers to identify challenges .....	4
Identify existing compliance gaps.....	4
<b>2. Establish a comprehensive plan .....</b>	<b>6</b>
Engage key stakeholders and partners .....	6
Find the right cloud vendor to meet your specific needs.....	7
<b>3. Connect to the cloud.....</b>	<b>8</b>
Establish IT as a resource .....	8
Get started with the cloud.....	9
<b>4. Provide training and support to early adopters.....</b>	<b>10</b>
Engage researchers of all technical backgrounds .....	10
Ease researchers onto the cloud .....	10
<b>5. Establish your new compliance process .....</b>	<b>11</b>
Target key guidelines to get more grants .....	11
Capitalize on direct billing and automated update cadences .....	11
<b>Conclusion.....</b>	<b>12</b>





## Introduction

Ensuring security and compliance in academic research is a challenging and expensive process, especially when on-premises systems are involved. With research teams using standalone systems, many institutions are stuck traversing the compliance process multiple times for each new grant, award or sponsored research effort. It can take weeks or even months to establish a compliant system before moving forward with the sponsored research effort. Even research using cloud resources doesn't always meet the stringent security and compliance standards required by such agreements.

Like many institutions, Kansas State University was experiencing these challenges. Building one-off compliant systems for every newly sponsored research effort was a lengthy and cost-prohibitive process, and the resulting systems were not scalable. K-State needed an enterprise solution, something to streamline the process for both research teams and IT.

K-State worked with Microsoft to overcome these obstacles by developing the Research Information Security Enclave, or RISE, a powerful cloud-based research system. The enclave offers highly secure cloud resources to researchers through a familiar desktop interface, dramatically streamlining the compliance process.

"The help from Microsoft has run the gamut," said Dan Sewell, senior computer/systems specialist and cloud architect at K-State. "Having face-to-face time with cloud solution architects has been great, and that's been reinforced by weekly webinars and a higher education Microsoft Teams group. It's all helped strengthen our partnership."

K-State chose to build its system on Azure Cloud because of its Federal Risk and Authorization Management Program, or FedRAMP, certification. Working with a FedRAMP certified product means RISE will be able to meet stringent compliance requirements. The enclave provides solutions that address most of the controls required to meet and maintain compliance with various information security standards including NIST SP 800-171, NIST SP 800-53, DOD CMMC, ISO 27001 and more. When paired with an existing compliance program, RISE provides a consistent deployment model, the ability to update security features and automation that saves time and money.

This document provides steps and practical advice for implementing a highly secure and compliant research enclave at your own institution, based on K-State's trailblazing effort.



## 1. Assess where you are today

A cloud-based solution like RISE can have a significant impact on the efforts of research teams. Before getting started, it's critical to analyze and understand the systems and platforms in place today and how your researchers use them. Without this assessment, you may end up allocating resources to a solution that will not be utilized or meet the appropriate information security standard(s).

### Work directly with researchers to identify challenges

Cloud-based technology is flexible and can adapt to changing needs, so start by identifying those specific needs. Meet with research teams and members of IT, recording use case information about research challenges—compliance, security concerns, grant and award approval difficulties, time spent waiting for compute and money spent on resources. Knowing which pain points are top-of-mind for researchers will help you explain the benefits of the cloud enclave to them down the road.

Gauge researchers' familiarity with cloud technology. Even if they aren't relying on the cloud for compute and storage, they are probably already using cloud-based

subscription software like Office 365. How do they feel about moving their workloads to the cloud? Do they have any concerns about security, scalability or other issues that could be addressed by the cloud? Remind them that the research tools they know and love won't change. They'll be able to access the same environments and programs they're used to, except housed on the cloud instead of on-site. It is important to help them understand that cloud technology will allow them to focus on research instead of compliance, as first impressions and researcher buy-in will make or break the transition to a new service.

### Identify existing compliance gaps

Research compliance is one of the most complex areas to evaluate, and one of the most important. Since worrying about multiple control sets is often a pain point for researchers and engineers, identify the main control sets. For K-State, one of the major sets was the National Institute of Standards and Technology (NIST) SP 800-171 guidelines that must be followed to store, process or transmit sensitive research, which often includes research data.

“Higher education is becoming increasingly regulated,” said Gary Pratt, chief information officer at K-State. “It’s not going to stop—it’s going to ramp up. That’s why I like the approach we’re taking. We have a pre-established environment that allows us to respond. I’m much more comfortable with increasing regulation of administrative data because we’ve already done it with our research data.”

And the requirements change periodically. “The NIST SP 800-171 standard was derived from NIST-800-53—the standard at which executive branch agencies have to maintain their systems,” said Ian Czarnecki, executive director of operations and technology. “Every time there’s an update to NIST SP800-171, we take a step closer to NIST SP 800-53.”

Staying current with these updates is vital to completing self-certifications for compliance and receiving a high score in any third-party audit. Therefore, it’s best to complete an exhaustive evaluation of how well you’re able to meet these standards. Meet with IT, general counsel and the research compliance office to work through the comprehensive guides provided by NIST. Along with the [NIST SP-800-171](#) guidelines themselves, the companion documents [NIST HB-162](#) and [NIST SP800-171A](#) are designed to help you complete a formal self-assessment to see which controls you

currently meet. In addition, the Department of Defense has published similar self-assessment documents for their Cybersecurity Maturity Model Certification, known as CMMC, requirements.

Some of the requirements, such as multi-factor authentication, are straightforward. Others are complex and may require additional interpretation and judgment. For instance, “Remediate vulnerabilities in accordance with assessments of risk” is a less concrete requirement that will need to be measured by internal risk management practices to determine whether your remediation efforts are sufficient. Other requirements, such as escorting visitors, cannot be addressed by digital technology at all. Note any gaps and areas of improvement you discover to better understand where the cloud can help.

As you identify these gaps, consider the policy changes that will be necessary to address them. How will compliance practices need to change to accommodate the cloud’s built-in controls? How much control of cloud resources will you give researchers? Which responsibilities will stay with IT? As you take questions like these into consideration, it’s time to begin systematic planning with stakeholders across the institution.



## 2. Establish a comprehensive plan

---

For K-State, the most time-consuming aspect of implementation wasn't technological complexity or the technical process of adopting the cloud—it was planning and implementing policies and standard operating procedures. A thorough change management plan is critical for success. It took K-State about three months between choosing a cloud vendor and running their first pilot, but this span of time will vary widely between institutions.

### Engage key stakeholders and partners

Getting the right groups of people in the room in the room is essential. This should include central IT, pre-awards, research compliance, office of institutional risk management, system engineers, security experts and any other key players that may be impacted by the new research enclave. Be sure to also include facility security officers, as they are generally active in matters of export control, sensitive research and foreign influence.

---

**“The foundational ingredient was a positive relationship between researchers, IT, and Microsoft.”**

**Peter Dorhout**

Vice President for Research, K-State

---



Collaboration between departments, especially between researchers and IT, is perhaps the single most important factor of success in this journey. It is important to explain the initial plans for implementation to these departments and ensure there is buy-in for how a cloud enclave will tangibly and positively impact their work.

For many stakeholders, one of the most appealing benefits will be the potential time savings, which could include streamlined adherence to compliance regulations or expedited processing time through cloud bursting. Researchers will also be excited that they do not have to manage complex compliance and security controls and can instead move into a more secure system that has already been set up.

K-State worked with Microsoft throughout the planning process, collaborating with Azure specialists to guide cloud adoption. Compliance officers and system engineers may be able to pinpoint compliance shortcomings, but it was helpful to have Azure experts to explain how the cloud can address those shortcomings.

“We’ve been able to strike up a collaborative relationship with Microsoft,” said Czarnecki. “This has not been a vendor relationship where we say, ‘We need x,’ and they deliver, and that’s the end of it. There has been a lot of back and forth. Our conversations with Microsoft have been incredibly powerful.”

### **Find the right cloud vendor to meet your specific needs**

Selecting a cloud vendor is a crucial part of the planning process. As there are many factors to consider and picking the wrong vendor can prove a costly mistake, the task can be overwhelming. Engaging researchers and stakeholders early in the process will help you discover key concerns, and thoroughly researching your vendor options will help ensure those concerns are solved.

For K-State, the crucial concern was compliance with federal regulations, including NIST SP 800-171 and export control regulations. “Microsoft was able to get the Azure Cloud FedRAMP certified, which is an incredibly high bar,” said Czarnecki. “This means RISE will benefit from the latest and greatest technology being rolled out in a timely manner, and meet these significant federal standards.”



### 3. Connect to the cloud

---

With a comprehensive plan in place, the next step is the adoption of cloud technology. For K-State, the technical buildout of RISE took only about two weeks. Of course, this timeframe will depend heavily on your specific needs and the scale of your project. Detailed guidance is beyond the scope of this document, but Microsoft offers support and comprehensive resources—including the [Azure Strategy and Implementation Guide](#), a detailed walkthrough of how to customize and integrate Azure.

#### Establish IT as a resource

During meetings with stakeholders, finding the path of least resistance for research teams is important. Adoption will be difficult if researchers see the solution as daunting or overly complicated, so a focus on determining the most intuitive user interface is critical. “We are able to provide each research team with something that’s highly recognizable, and they’re able to conduct research securely,” said Czarnezki.

Encouraging interaction between departments early on can provide additional benefits by helping keep lines of communication open and active down the road. “Research teams view central IT and the research office as a resource,” said Czarnezki. “They’re throwing ideas our way—‘Do we have a solution for this?’ or ‘How would you handle this?’ or ‘Is anyone else on campus working on x, y, or z?’ It’s really helped to thaw out the lines of communication.”

---

**“Research teams are viewing central IT and the research office as a resource. It’s really helped to thaw out the lines of communication.”**

**Ian Czarnezki**

Director of Operations, K-State

---





## Get started with the cloud

With RISE, you have multiple options for running applications in the cloud. If researchers have already set up the applications needed, images of their environments can be used as templates for virtual machines, or VMs, managed in RISE. The enclave also provides the ability to rely on pre-built images as a starting point. "RISE is a one-stop-shop," said Czarnecki. "We can monitor across the entire research portfolio or a specific VM."

The enclave offers multiple compute service options to suit diverse needs, and more than one can be selected if necessary. Regardless of the option you choose, the benefit of the cloud is the ability to only pay for the storage and compute you use. "On-premises resources are never utilized at 100%," said Sewell. "Instead of buying the max and letting it waste away, researchers are able to pay for exactly what they want and get burst or ramp-up when they need it."



## Microsoft Teams: a unified collaboration platform

You may want a more intuitive way to surface the enclave to your researchers than remote desktop interfaces and command line prompts. [Microsoft Teams](#) acts as a single pane of glass to connect your researchers to all the compute they need, without them having to worry about technically complex backend processes. Teams integrates with a wide range of third-party apps, including those that research teams at your institution may already be using, such as ResearchSpace, GitHub, Trello and more.

Teams offers the same security certifications as Azure, helping to safeguard any sensitive data your researchers share through the app. And it empowers researchers to easily collaborate with peers from other institutions in a highly secure environment. As you adopt Teams, keep in mind that Microsoft Power Platform tools like Power Apps and Power Automate [connect to Teams](#) and can aid in surfacing cloud resources and expediting administrative processes.



## 4. Provide training and support to early adopters

Once planning and technical implementation are complete, it's time to kick off the piloting stage. There is no need to create test data or projects for researchers; K-State ran their pilot using live data from ongoing research. Members of different teams were selected to ensure RISE was tested with diverse types of research.

### Engage researchers of all technical backgrounds

When selecting your pilot cohort, it can be tempting to only select the researchers you know will understand and appreciate the technology. While it may sound counterintuitive, don't shy away from including researchers of all technological comfort levels. More adept members of the group may learn fairly quickly, but it's important to verify that members with less technical skill can also learn. "Overall, the feedback was really positive, and there were a few things that we could refine, and we've done so," said Czarnecki. "A few

of those individuals have actually turned into champions and helped get the word out about RISE."

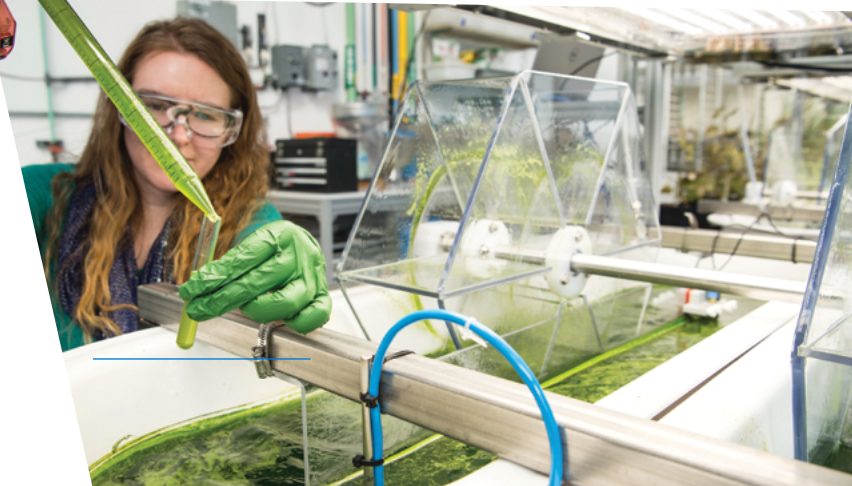
Look out for those champions during your pilot, as they may be able to spread awareness and enthusiasm about the enclave as you push adoption further. Encourage everyone who participates in the pilot to keep the lines of communication with IT open, ensuring that ongoing refinement of the system is a collaborative effort between software engineers and the faculty who are using the enclave in their day-to-day research.

### Ease researchers onto the cloud

RISE has so many capabilities that it may seem like a firehose of information for your researchers at first, so don't attempt to introduce every feature right away. K-State only pushed the enclave out to select research teams at first and avoided immediately inundating researchers with more complex features such as the [Azure Security Center](#).

As you drive adoption past your pilot cohort, plan to schedule training sessions to walk researchers through use of the

new technology. Some of the training responsibilities can come from the IT staff who have become most proficient with the cloud, and the champions from your pilot teams can also be great advocates and teachers. These initial sessions will help ensure that your research teams are in agreement, and that their process of learning will strengthen the relationship and communication between research teams and IT in the future.



## 5. Establish your new compliance process

---

With RISE in place, you will be able to establish systems that comply with grant and award requirements much more quickly, and you'll no longer have to build a new compliant system for every new sponsored grant. The cloud will take care of the technological side.

---

**“Researchers are a little blown away by the power that is in their hands and the breadth of things that can be done in Microsoft Azure.”**

**Ian Czarnecki**

Director of Operations, K-State

---

### **Target key guidelines to get more grants**

While RISE addresses the majority of NIST SP 800-171 guidelines, making it easier to certify systems' compliance—both in grant and award applications and in routine mandatory reports to government agencies—it is important to note that RISE cannot address every compliance regulation.

“We still have compliance tasks on the physical side, but this has put us light years ahead in the virtual space,” said Pratt. “The security and compliance benefits are incredible, and the enclave has also opened the door to things beyond that.”

### **Capitalize on direct billing and automated update cadences**

K-State also used Azure to directly bill cloud costs to research award funds, as opposed to processing awards and then paying for the compute resources with internal funds. The cloud gives you a consistent deployment model so that you can push compliance standards easily to new systems, and you can leverage Azure's automated updates to keep your systems at the cutting edge of security. In addition to updates within Azure itself, the Azure Security Center audits all computers and VMs on your network to provide a list of which

ones are missing critical or non-critical operating system updates.

Overall time savings from the cloud enclave are enormous in comparison to an on-site setup. "Previously, it could take upwards of two or three months before the researchers could even get a system in place, before they can even accept the money," said Cheryl Doerr, associate vice president for research compliance at K-State. "Now, we can add someone in five minutes, so in 24 to 48 hours, we can have a grant approved."

## Conclusion

With RISE, you can empower your research community to accelerate breakthroughs and meet policies, security and governance models automatically. Cloud-based resources provide templates of functionality that are repeatable and scalable, reducing overhead and increasing the time available for actual research.

While your researchers get comfortable using RISE, decide where you want to grow next. There are practically limitless options for building on the enclave and continuing to expand and refine your research processes. Maybe you want to take your compliance standards even further, moving toward more comprehensive guidelines like NIST SP 800-53 so that you're ahead of the game.

"Remember it's a journey," said Czarnecki. "We started with NIST SP 800-171, quickly outgrew that, and we're now managing multiple standards within the enclave and talking about taking on some pretty significant standards and general research. Set realistic expectations about what you're going to be able to do and continue moving forward."

---

**"In 24 to 48 hours,  
we can have a grant  
approved."**

**Cheryl Doerr**

Associate Vice President for Research Compliance, K-State.



To get started with a cloud enclave for academic research at your institution, reach out to Microsoft [at this link](#).

Visit K-State's own page about RISE [at this link](#).