Looking Forward

How Moving IT to the Cloud Can be More Efficient and Effective (If You Do it Right)

October 14, 2019: 10:30-11:30 am

Presented by:

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Scott Midkiff, *Virginia Tech*

Your hosts for this session

Dr. Paul N. Friga; pnf@unc.edu

- Clinical Associate Professor of Strategy, UNC Kenan-Flagler School of Business;
- Chief Strategy Officer and Co-Founder, ABC Insights (Benchmarking Consortium)

Randy Gentzler

- Vice President for Business and Finance and Treasurer at Loyola University Maryland
- Oversees treasury services, budget and planning, tech services, HR, facilities, etc.

Dwayne Pinkney

- Senior Vice President for Operations and Administration at Virginia Tech
- He brings 23+ years of higher education finance and admin management experience

Randy Saba

- Currently serves as the Interim Associate CIO at Loyola University Maryland
- Served as the Executive Director of Enterprise Applications since 2017

Scott Midkiff

- VP for Information Technology and Chief Information Officer at Virginia Tech
- Responsible for information technology strategies, services, and infrastructure

Executive Summary

Moving IT to the Cloud
An Overview

Moving IT to the Cloud
A Discussion

Moving IT to the Cloud – An Overview

Moving IT to the Cloud

An Overview

Moving IT to the Cloud

A Discussion

What does moving IT to the cloud mean?

Traditionally, universities and enterprises would manage their own data centers and products for managing finance, HR, and other solutions. Cloud solutions allow you to outsource this data management to a third-party provider, which can create cost savings, more effective products, better customer support, and greater future flexibility.

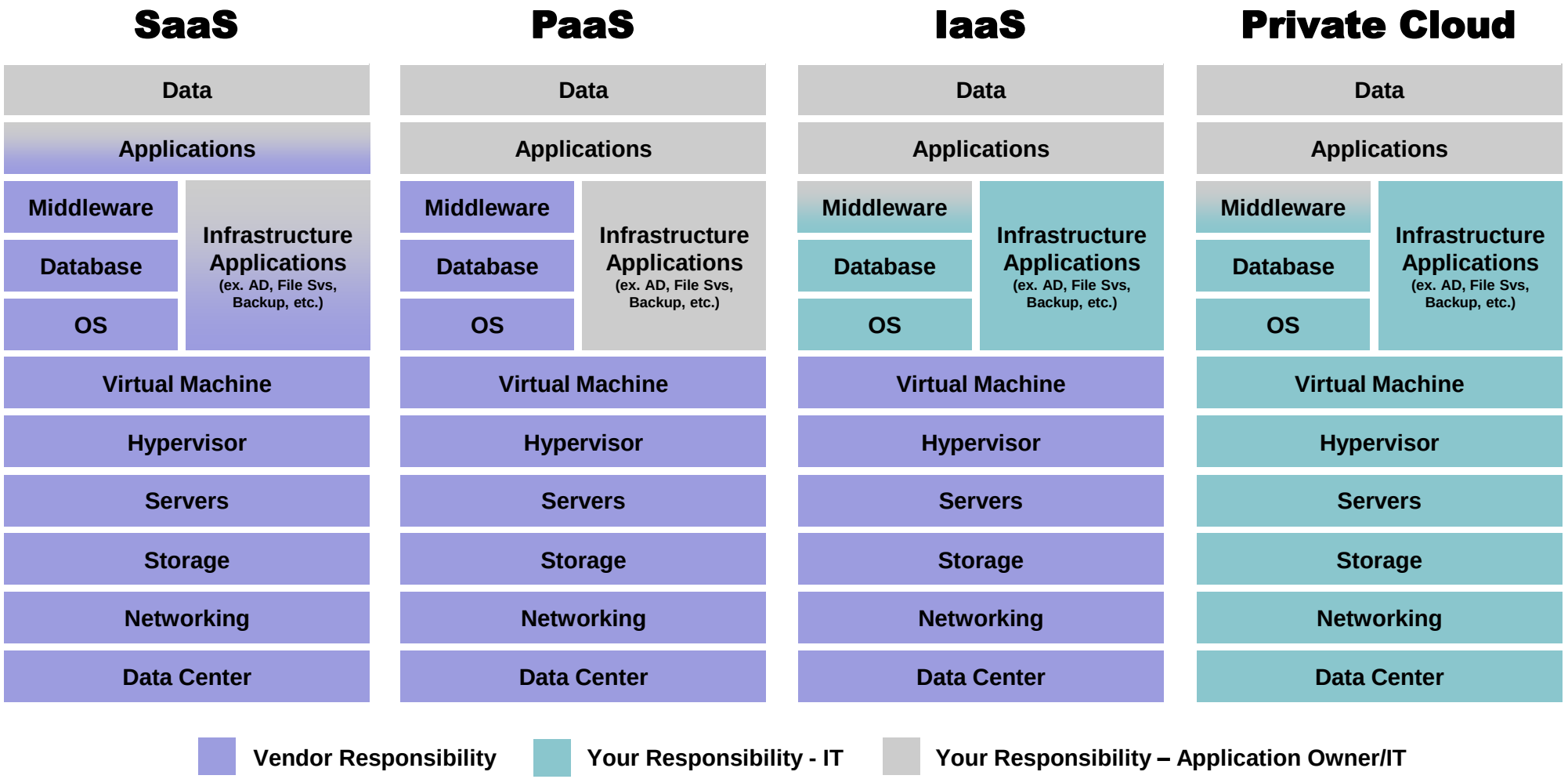
There are four primary cloud services offered

SaaS	PaaS	IaaS	Private Cloud
Software as a Service	**Platform as a Service**	**Infrastructure as a Service**	**Privately Hosted Cloud**
SaaS allows you to use applications managed by a third party on a cloud infrastructure, like email and productivity tools	PaaS allows you to provision and manage basic computing resources on a shared platform, such as an operating system	IaaS allows you to deploy your own applications on a cloud infrastructure, e.g. servers or data storage	Hosting your own private cloud requires creating, hosting, and deploying all cloud products
Low cost, simple adoption, easy to use anywhere	**Multiple computing language capabilities, vendor handles server infrastructure**	**No expenses for hardware infrastructure, scalability, reliability of large provider**	**Full control over hosting, scale, and offerings**
No control over hardware, no control over platform parameters	**No control over the virtual machines processing your data**	**Expensive option since you are responsible for infrastructure management**	**Most expensive option since you must build and manage all aspects**

Increasing investment, on-premise management, and flexibility

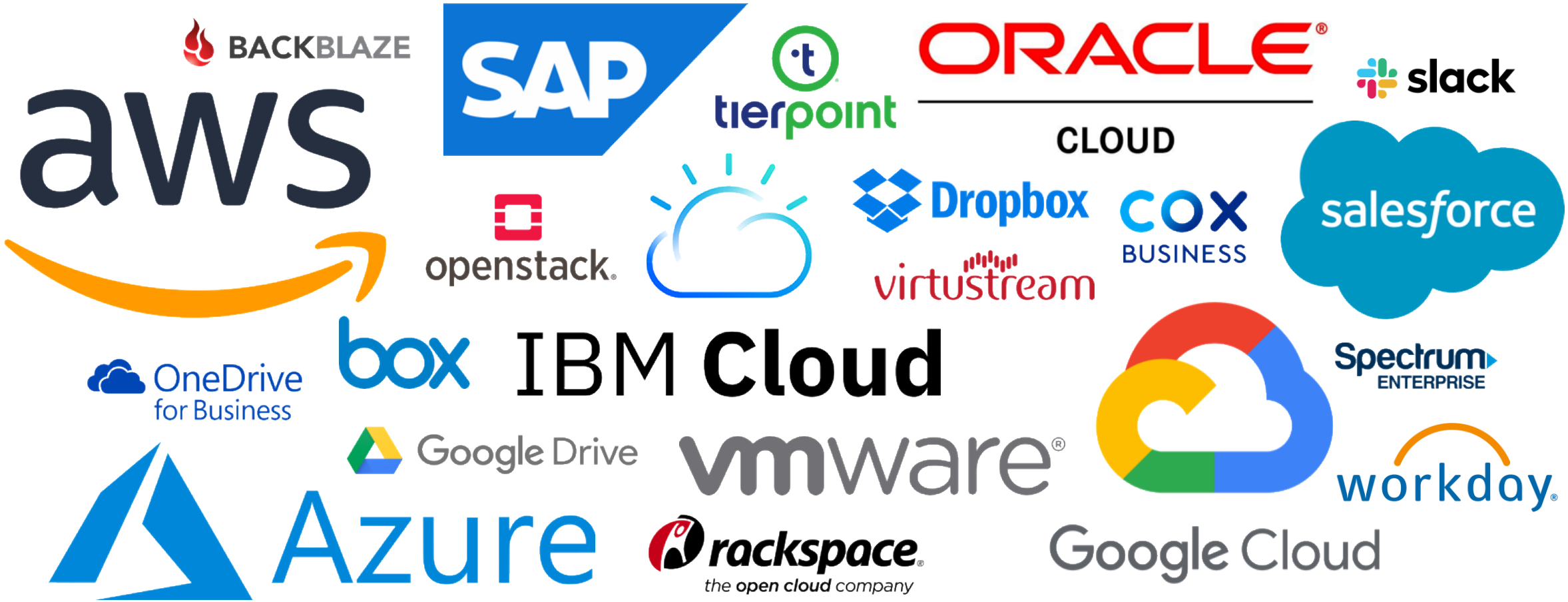
Source: Ellucian, Oracle, Inside Higher Ed

There are four primary cloud services offered



Source: CloudExpectations

But there are many different vendors



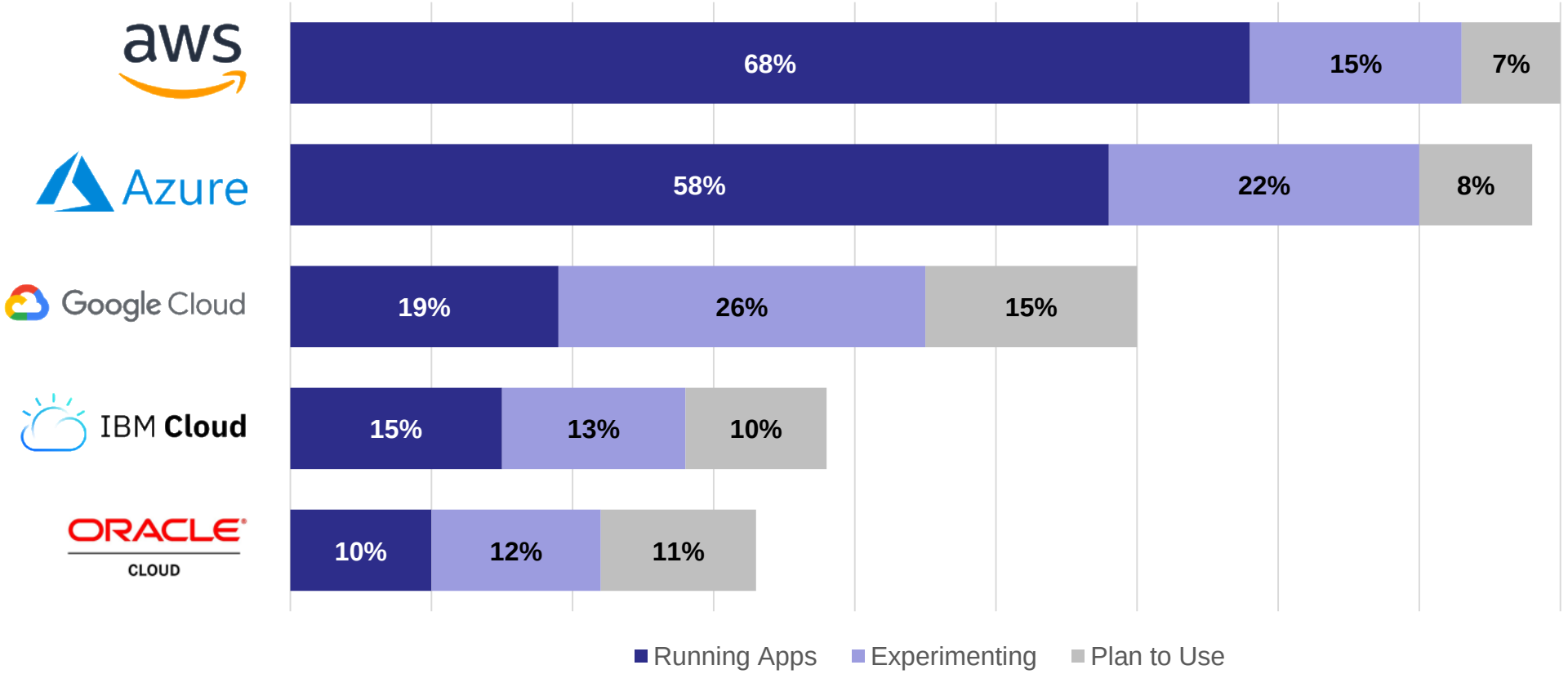
Each with unique strengths and weaknesses

Vendor	Offering	Market Share *(Q1 2019)*	Advantages	Challenges
aws	Primarily IaaS and PaaS, offer SaaS	**32.3%**	Experienced in large-scale cloud solution implementation, large partner network, and global databases	Could be less useful for legacy systems, has less robust SaaS offerings than competitors
Azure	Primarily Office 365 SaaS, also offer IaaS and PaaS solutions	**16.5%**	Second largest market share, compatibility with .NET programming, well-rounded enterprise features,	Has a steep learning curve and is a relatively expensive option
Google Cloud	SaaS products, capabilities for IaaS and PaaS	**9.5%**	Easy integration of SaaS products, strong knowledge of AI products and devotion to AI ethical standards	Less popular platform
IBM Cloud	IaaS, PaaS, SaaS	**3.6%**	Good choice for legacy systems, constantly evolving from long data history, wide breadth of capabilities	Smaller market share with less focus on innovation than newer tech firms
ORACLE CLOUD	IaaS, PaaS, SaaS	**N/A**	Integrates seamlessly with other Oracle products, offers cost advantage	Smaller global footprint in available data centers, less breadth of cloud solutions

Source: Company websites, Canalys, Squadex

Each with unique strengths and weaknesses – Cont.

Usage of Public Cloud Platform Services Running Applications Worldwide (2018)



Source: RightScale 2018 State of the Cloud Report

Moving IT to the cloud offers both costs and benefits

Costs

- SaaS: higher operational costs due to the continued pay-as-you-go investment, but lower capital costs on hosting servers
- IaaS and PaaS: mixed costs of a vendor combined with in-house development and system management
- Change to IT staff descriptions and structures
- Training for IT staff, general staff, and students
- Relationship and security management with vendor of cloud services
- Risk of blame for vendor issues

Benefits

- Scaled vendor system provides faster services
- Flexibility to change products without uprooting current infrastructure
- Ability to access services from anywhere
- Better support availability at a lower cost to the institution
- Planned operational expense for services
- Pay-as-you-go model prevents paying for unused service
- Ability to scale products as you move forward

Source: Oracle, Forbes, Inside Higher Ed, Ellucian

But presents many challenges to successful adoption

Key Challenges

Investment

There's a significant initial investment into a new system, in both infrastructure and training

Staffing

Hiring and retaining high quality IT staff is expensive and difficult

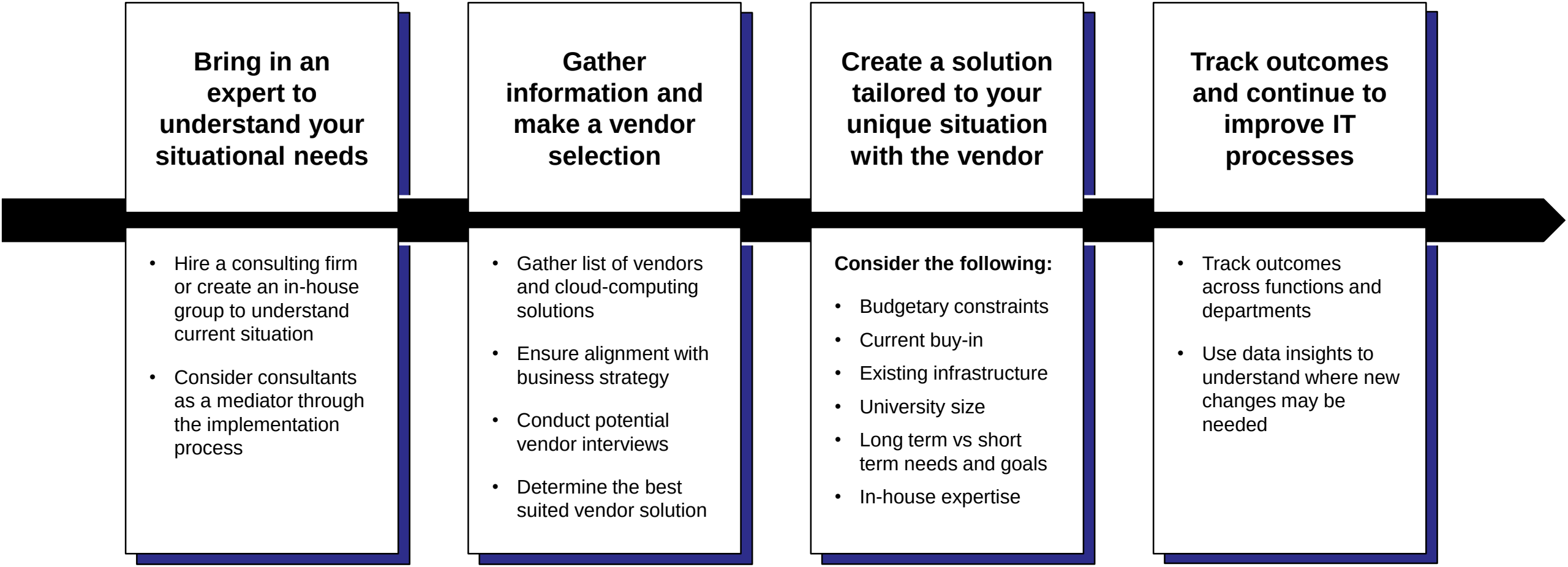
Vendor Relationships

Some vendors can change prices, or not deliver the level of quality promised in the sales pitch

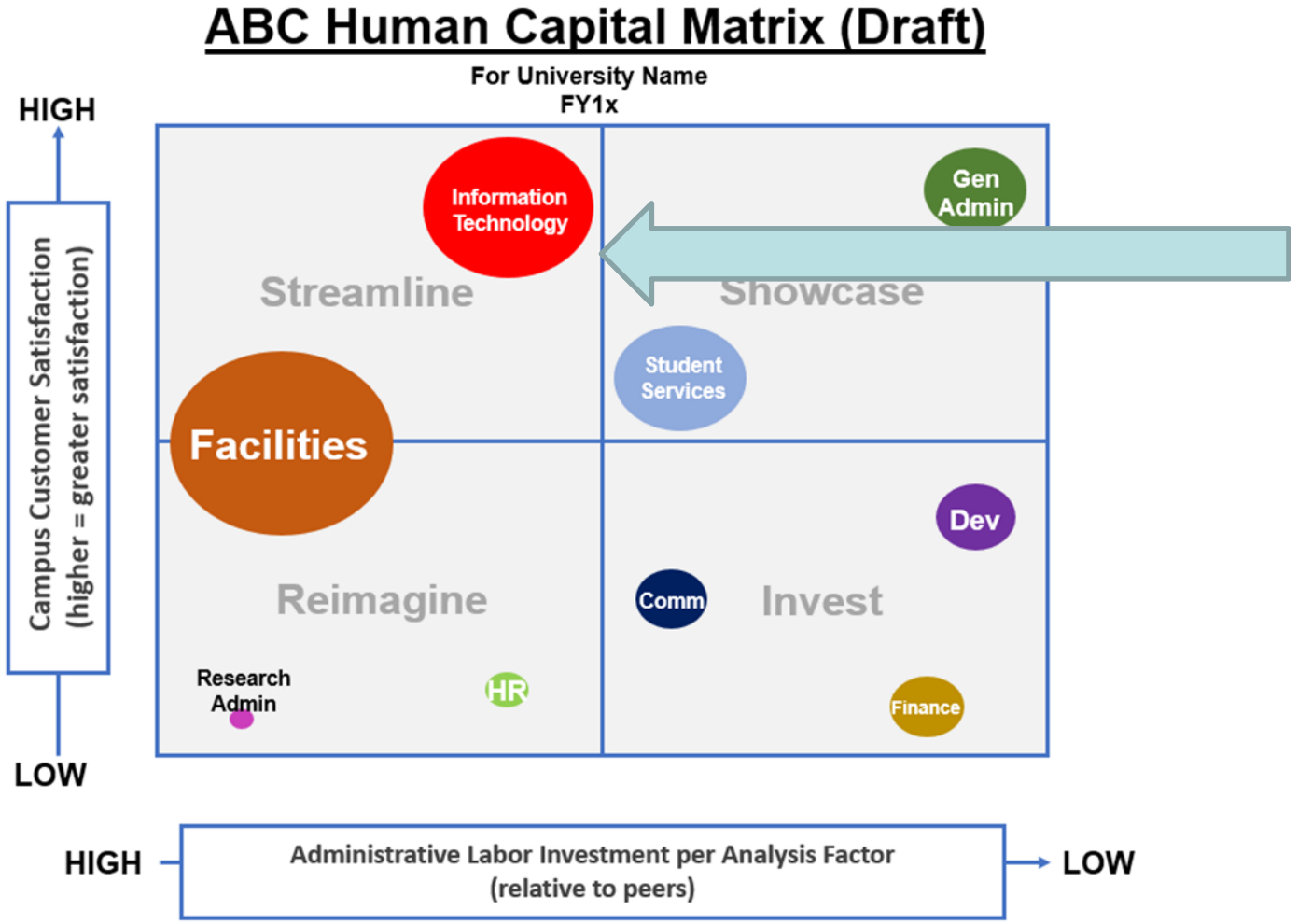
Hacking

As more sensitive data is stored on the cloud, hacking can become a serious security threat

A tailored cloud solution can improve outcomes



ABC Insights provides a way to benchmark IT spend



IT INVESTMENT

- App Development
- Education Tech
- Infrastructure
- Security/Privacy
- User Support

Moving IT to the Cloud – A Discussion

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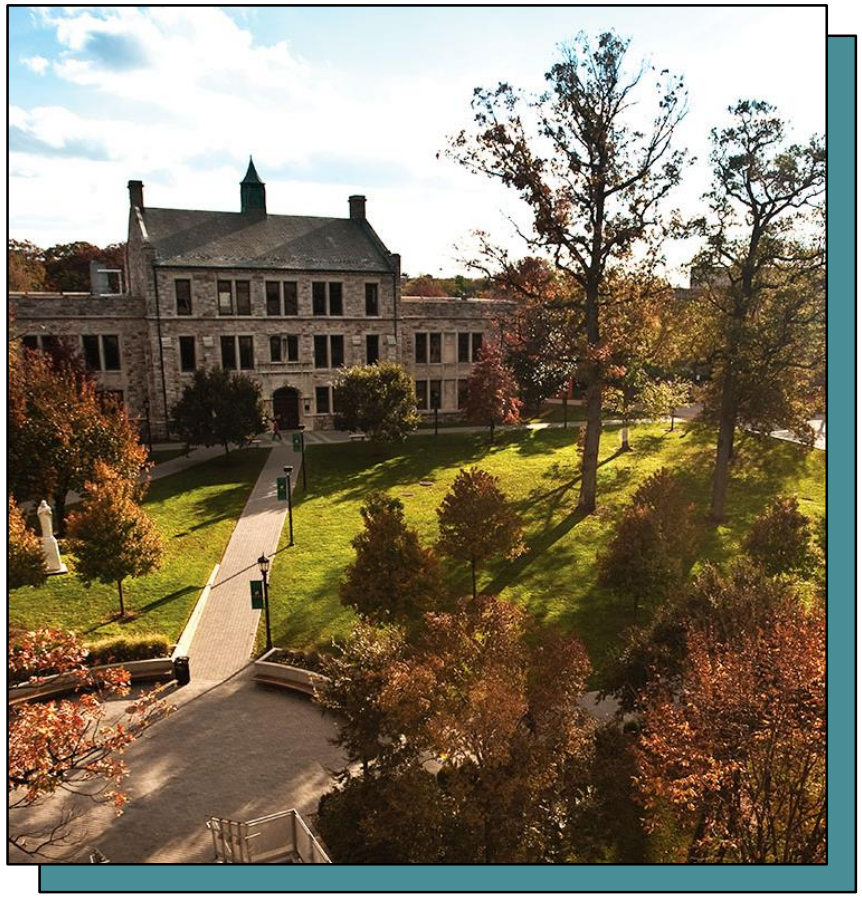
Loyola University

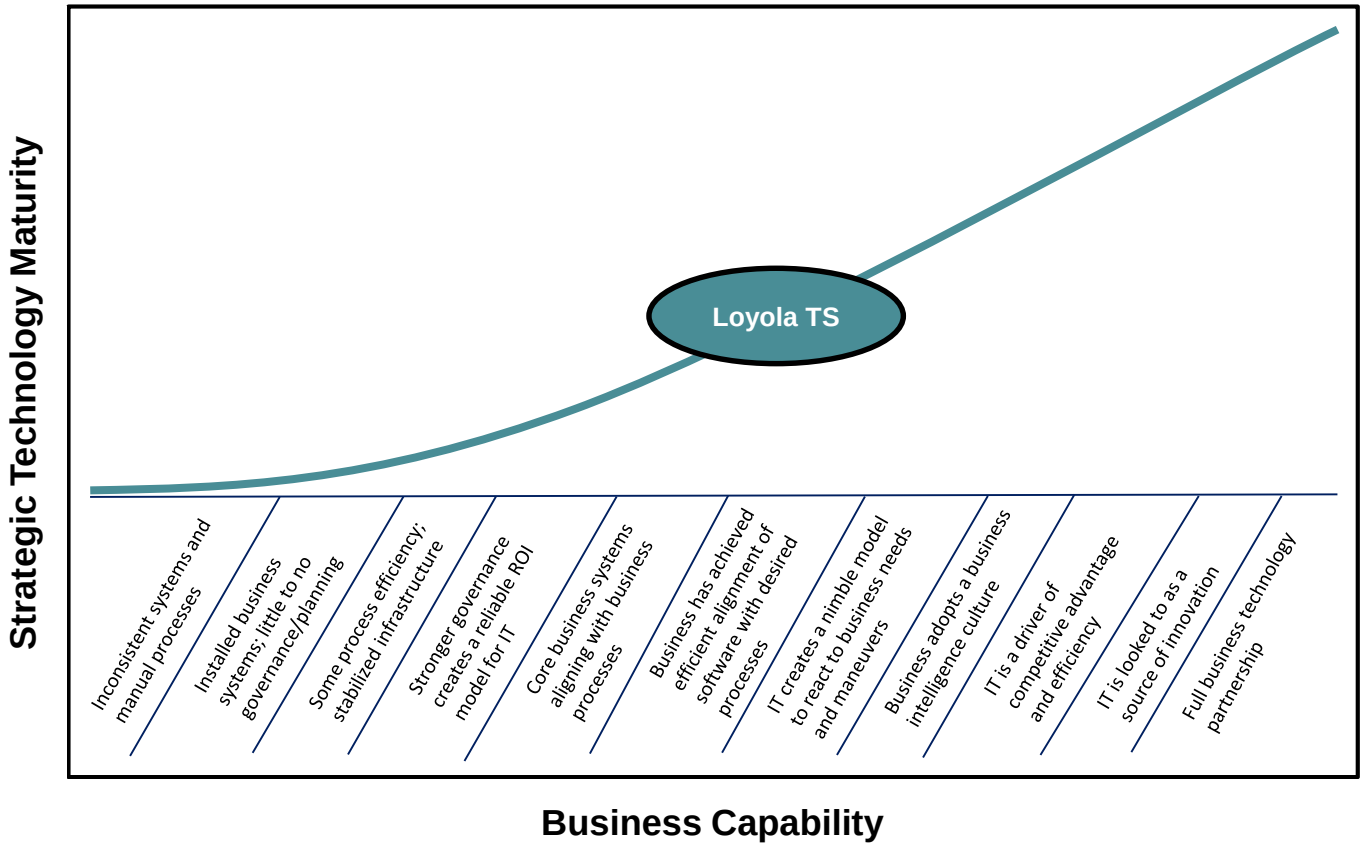


- Founded in Baltimore, Maryland, in 1852
- 4,000 undergraduate and 2,000 graduate students
- 12:1 student-faculty ratio
- 80% 4-year graduation rate
- Endowment value: $228M (as of 5/31/2018)
- FY17 annual operating budget: $289M
- FY17 total undergraduate tuition, room, board, and fees: $63,350

Transforming technology services

- Loyola's Technology Services organization
  - 60 employees
  - Five sub-departments focused on the pillars of Communication, Differentiated Services, Operational Excellence, and Transparency and Understanding
- Strategic IT assessment to determine:
  - Are resources being used effectively?
  - Are current systems, activities and personnel producing the desired organizational results?

Technology Maturity Model



Transforming technology services - continued

IT department faced several challenges

- Project management issues completing projects on time and on budget
- Difficulty keeping up with technology
- Staff turnover
- Loss of user community confidence

Our goal was to transform IT from a cost center to a revenue generator

- Conducted a 360 degree audit
- Hired an outside consultant
- Looked for opportunities to improve efficiency

Cloud analysis yielded tremendous efficiencies

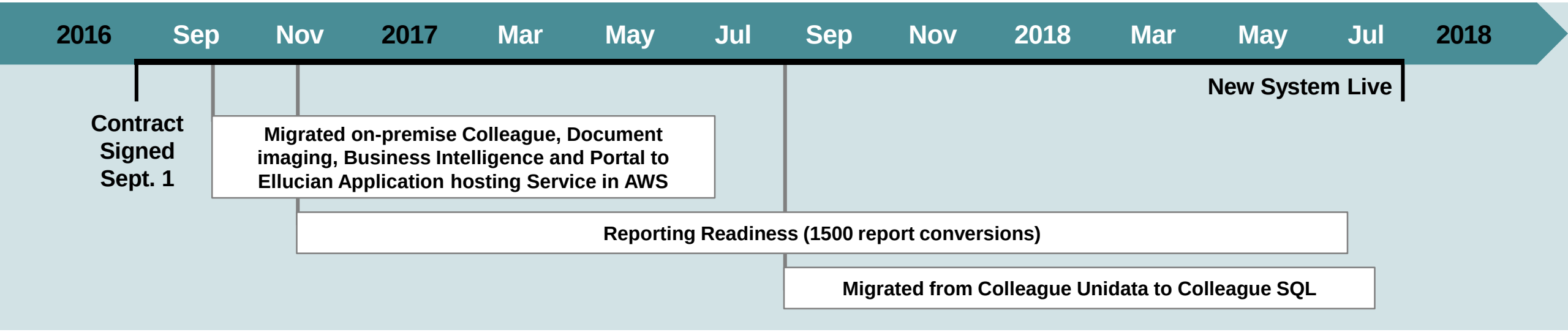
- Upgrades and patches are handled for us
- Retaining skilled staff becomes vendor responsibility
- Resources are freed-up to support lines of business
- Operational and capital expense savings

Transformation

Key Efforts

- Evolved Technology Services from a fully centralized organization structure to a shared services model with clear accountability lines
- Implemented Project Rationalization Process that focuses on the total cost of projects (hard and soft expenses), alignment with goals, funding status and available resources
- Start to move on-premise systems to off-premise environments (cloud) for cost savings, increased reliability and scalability, and new availability of physical space
- Strengthen customer relationships and service delivery

Loyola's journey to the cloud was a multi-step process



Cloud Project Management

- IT project management staff took the lead
- Consultants provided oversight, knowledge, and expertise
- Implementation plan should last a full business cycle

Change Management

- User groups involved in planning and testing
- Communication is critical, especially with partners
- Need to coach technical staff

Results of the change implementation

- Moved to the Cloud in July 2017.
- Moved from Unidata to SQL July 2018
- Implemented state of the art business intelligence tool
- Move made to de-risk our ERP environment
  - Reduce the support complexity
  - Staff now focusing on business goals (rather than patching)
  - Disaster Recoverability
  - Application currency (automatic upgrades)
  - Initial step toward SaaS (with over 900 custom programs, we need to move)

Operating Expenses ($000)

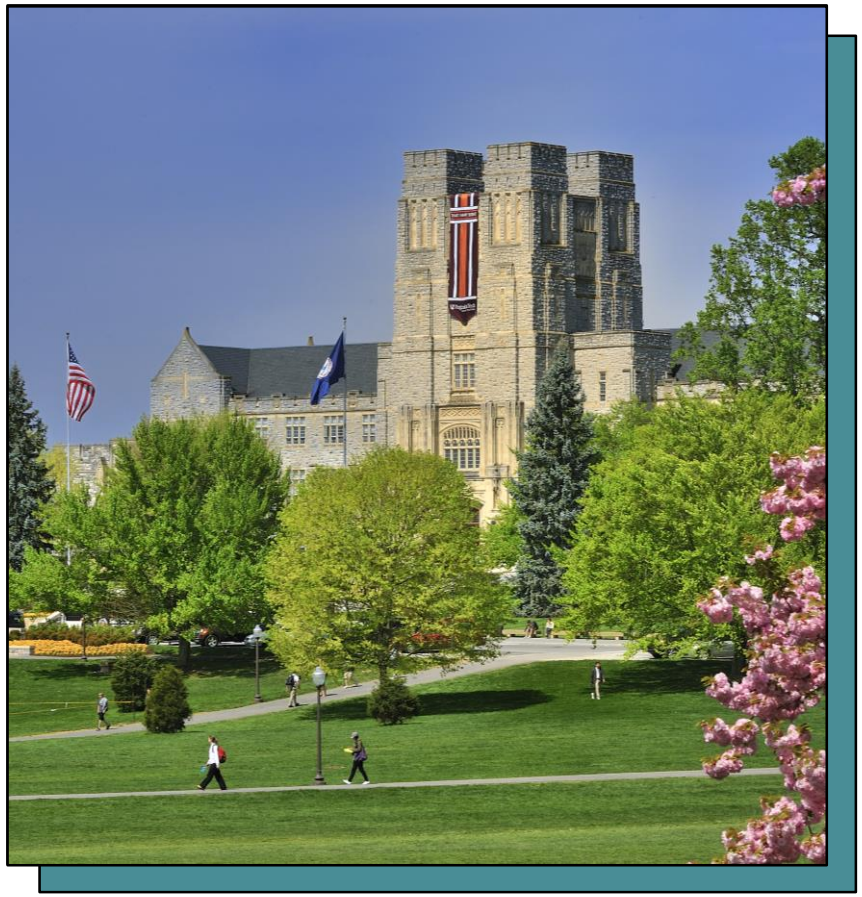
17 Vacant, transferred or released positions	$(1,256)
Software/system support/operational savings	$(244)
7 New restructured positions	$833
Cloud hosting and related Services	$489

Capital Expense ($000)

Annual Cap-Ex	$(500)

Total Net Savings **$678k**

Virginia Tech



- Virginia Tech was founded in Blacksburg, Virginia in 1872
- 26,623 undergraduate and 6,780 graduate students
- 1,395 academic staff
- 82% 6-year graduation rate
- Endowment value: $1.15B (2018)
- FY18 annual operating budget: $1.5B
- FY18 total undergraduate tuition, room, board, and fees: $23,033 (in-state) or $42,177 (out-of-state)

Virginia Tech's Cloud Journey to date

- Virginia Tech has focused on deploying new services and capabilities to the cloud rather than wholesale migration
- Example deployments in the cloud
  - Summit research administration application
  - The Virginia Cyber Range
  - Ongoing data lake pilot
  - Several account, group, and certificate management services
  - Some development, integration, test, and QA environments
  - Multiple SaaS applications

SUMMIT

VIRGINIA CYBER RANGE

Virginia Tech and the Cloud

Virginia Tech is realizing multiple benefits from building applications in the cloud

- Ease of innovation and exploring
- Flexibility in deployment and ease
- Rapid initial deployment and continued scaling
- Cost-effective deployment and operation
- Synergy with DevOps and CI/CD approaches

Security is always a concern

- We worry about privacy, compliance, and reputation
- Our concerns are fundamentally the same whether an application is on premises or in the cloud

Data are the new border

All data must be secured regardless of location.

Encryption at rest or in transit

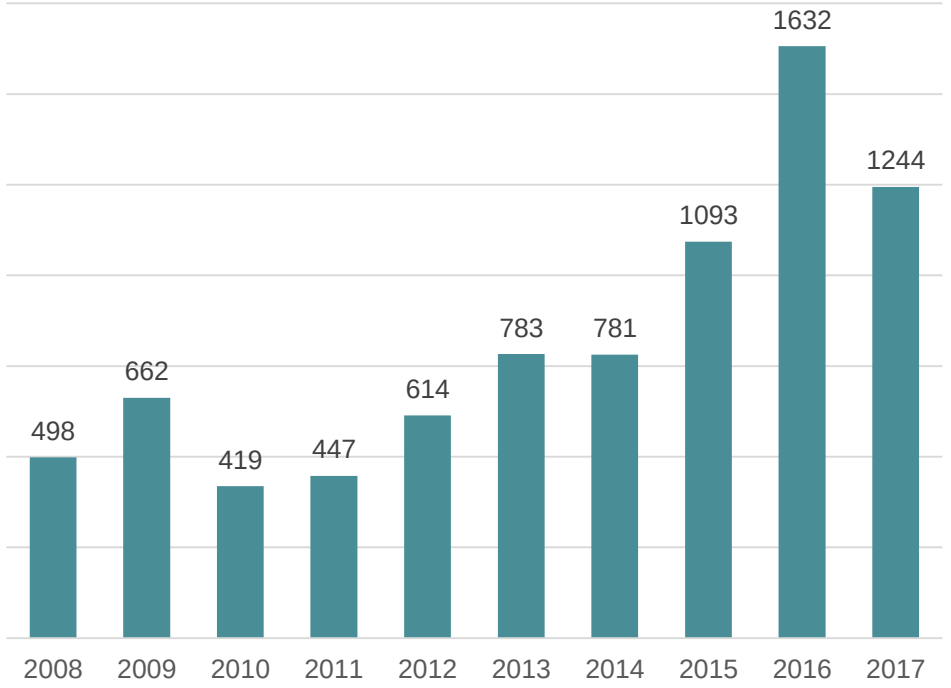
User identities must be confirmed.

Access to data strictly enforced. Default of minimum privileges

All network traffic should be logged and analyzed.

“Trust but verify” and “Verify and never trust”

Annual Data Breaches in the US (millions)



Source: Statista

The corporate structure is shifting to the EDU model

Administrative - the process that runs the institution ("Corporate")

- Payroll, HR, Purchasing, Facilities, Legal, etc.
- Security model closest to corporate model

Academic and instructional – the process that supports teaching and learning ("ISP")

- Learning management systems such as CANVAS, Blackboard, Moodle
- Course Delivery systems – Zoom, Webex, etc.
- Heavily BYOD – all flavors and types
- Security model closest to an Internet service provider

Research – hybrid of administrative and academic/instructional

- Intellectual property protection
- High risk, visibility
- Security model is a hybrid of corporate and ISP

Zero Trust Network (ZTN) Characteristics

Network and user traffic patterns have change dramatically in the past 20 years.

Pillar 1: The network is always assumed to be hostile

Pillar 2: Assume the hostiles are already inside your network

Pillar 3: Network locality (segmentation) is not sufficient for deciding trust in a network

Pillar 4: Every device, user and network flow is authenticated and authorized

Pillar 5: Policies must be dynamic and calculated from as many sources of data as possible

Positioning IT Security for the future

Pillar 6: The device is no longer the border, a user's identity is the new border

Pillar 7: Containers, serverless and cloud computing are the new disruptors

Pillar 8: Mobile users, mobile apps, mobile storage

Source: "Zero Trust Networks" Evan Gilman, Doug Barth

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