Cloud-Based IT Infrastructure and High Performance Computing
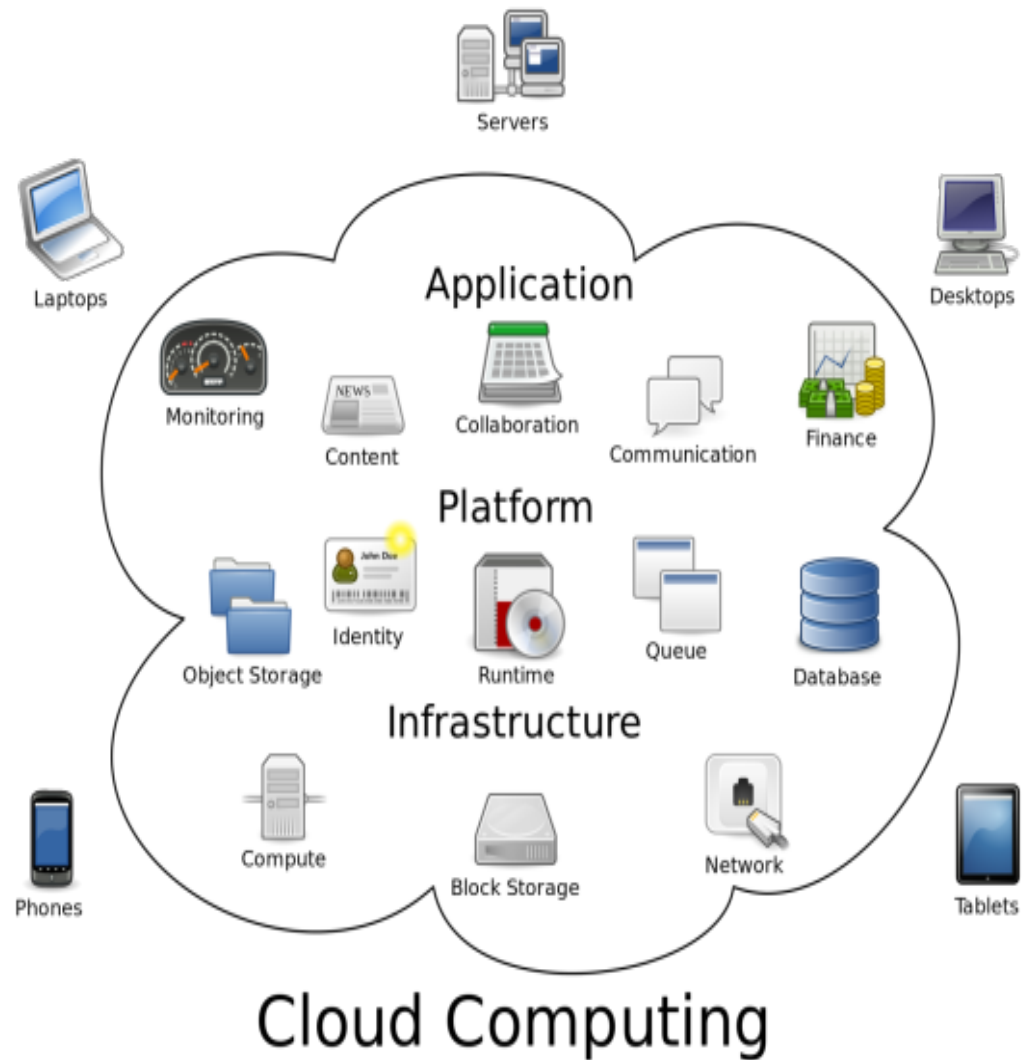
The New Frontier of IT in Higher Education

August 31, 2016

What is the Cloud?

The **Cloud,** simply, refers to software and services that run on the Internet instead of your computer.

Cloud Computing

# What Applications are Offered in the Cloud?

Human Resources
Payroll
Recruiting
Student Administration
CRM

Financial Management
Supply Chain
Budgeting and Planning
Business Intelligence
Order Management
Project Management
Grants

What is the Difference?

On Premise

- Perpetual licensing fee

- Client owned

- Done on site by a client or by a third party

- Client purchased

- Owner supported

- Longer implementation cycle

- Customizations are managed by your staff
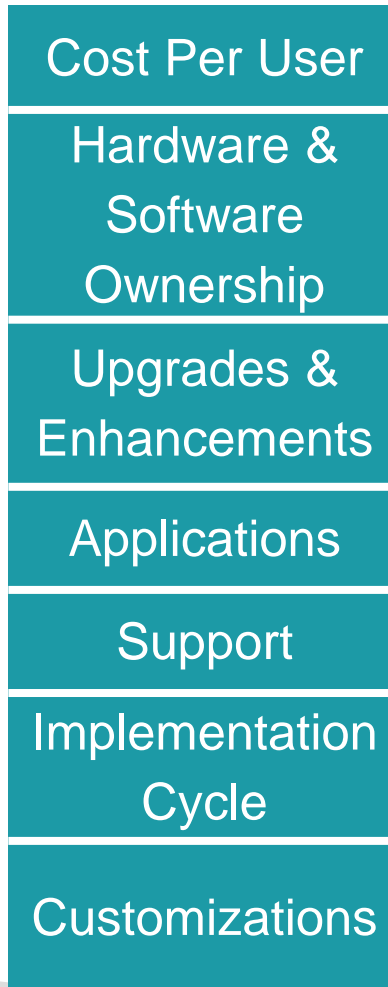
Cloud Solutions

Cost Per User	- Subscription per seat and/or functional area
Hardware & Software Ownership	- Vendor provided hardware/technical support
Upgrades & Enhancements	- Virtually synced with cloud solution
Applications	- Monthly or annual subscription
Support	- Vendor hardware/technical; Client functional/business process
Implementation Cycle	- Shorter implementation cycle
Customizations	- Customizations not made to base application; rather configuration or 'bolt-ons'

While only 2 percent of Gartner survey respondents said they had core ERP systems running in the cloud, almost half indicated they planned to make the move within 5 years.

Noel Radley, Market Research Associate, Software Advise

Trends in deployment preference

12%
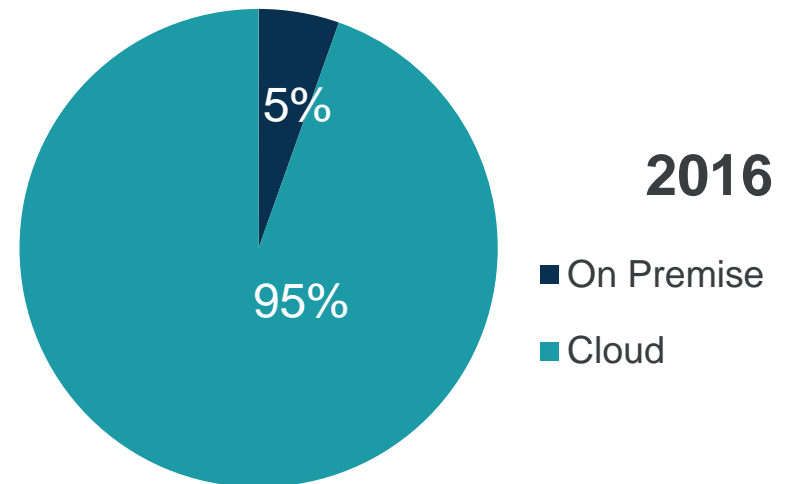
88%

2008

■ On Premise

■ Cloud

"
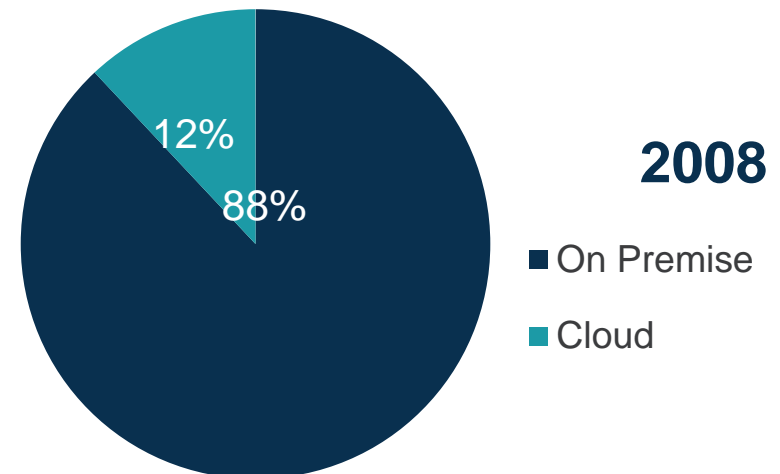
New research recently released by RightScale, reveals that 95 percent of companies are using some form of cloud computing, a clear indication that the cloud has quickly become an essential ingredient of modern IT.

RightScale Cloud Management

Trends in deployment preference

5%

95%

2016

■ On Premise

■ Cloud

Challenges of the Traditional IT Infrastructure

- **Cost** →Information technology costs have increased significantly over the past decade, including hardware, software, and maintenance/upgrades

- **Data Security** → Decentralized structure creates increased risk of data loss or security breach, also requires more dedicated IT security staff

- **System Maintenance** → Deploying upgrades or performing system maintenance on local hardware can be expensive, inconvenient, and time consuming

- **Outdated Technology** → Shorter hardware lifecycle hinders system performance and limits scalability
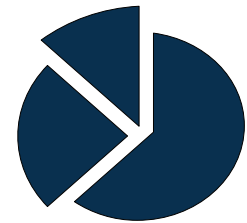
49% of CAOs and CFOs at 4 year Public institutions say that technology improvement and maintenance is one of the greatest cost drivers

Benefits of Moving to the Cloud
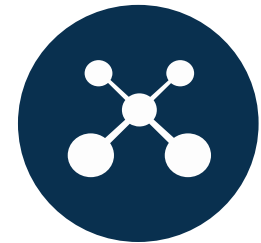
- **Lower Costs**

  − IT Infrastructure Costs
  − Implementation Costs
  − Staffing Costs
  − Application Maintenance/Upgrade Costs

- **Improved Security**

  − Dedicated Security Resources
  − Secured Infrastructure
  − Business Continuity

Benefits of Moving to the Cloud

- **Reduced Maintenance**

    − Highly Configurable

    − Streamlined Process

    − Regular Automated Upgrades

    − Transition to Vendor Resources

- **Improved Technology**

    − System Performance

    − Frequent Updates

    − Use of the Latest Technology Standards

    − Improved Scalability

High Performance Computing and Cost Recovery

High Performance Computing

Centralized Performance/Cloud Computing

In order to centralize and streamline the IT infrastructure, many institutions have established high performance computing centers to provide cutting edge technical capabilities to the research community across a variety of academic disciplines.

These services can include:

- High performance computing
- High throughput computing
- Cloud-based computing services
- Storage of large data sets
- Data backup and security
- Performance networking capabilities

High Performance Computing

Challenges for the Institution

- Establishing and maintaining high-performance computing centers can be extremely expensive for the institution. Costs include:

  - Servers and other hardware

  - Software licenses and maintenance

  - Technical staff and IT security personnel

  - Facilities costs, which can include the usage of space and utility costs

- How can an institution recover some of these costs on an ongoing basis while continuing to provide critical support to the research mission?

  - **An Option:**

    - **Operate as a recharge/service center, establishing billing rates for each service provided and charge on a per-use basis**

Cost Recovery

Recharge/Service Centers under the Uniform Guidance

- Under the Uniform Guidance (§ 200.468), the cost of operating a specialized service facility or recharge center is considered an allowable cost assuming the following conditions are met:
  - The costs of services must be charged **directly** to applicable awards based on the actual usage of the services on the basis of a schedule of rates or established methodology
  - That Methodology must be designed to **recover** only the aggregate costs of the services. The costs of each service must consist normally of both its direct costs and allocable share of all indirect (F&A) costs.
  - Rates must be adjusted at least **biennially**, and must take into consideration over/under applied costs of the previous period(s)

In other words, a recharge / service center must charge awards directly based on usage, according to calculated billing rates designed to break-even, and these rates must be reevaluated at least every other year.

Cost Recovery

Calculating Billing Rates- Direct vs Indirect Costs

- The "break-even" rate for each service is determined by estimating the annual direct costs of providing the service with the total estimated usage. Allowable direct costs include:

    – Personnel (salary and fringe)

    – Materials and supplies

    – Maintenance contracts

    – Equipment depreciation (depending on institutional policy)

    – Other direct costs

- Indirect (or F&A) costs are typically not easy to allocate to the operation of the service center and are often not included in the "break-even" rate

Cost Recovery
Calculating Billing Rates- User Groups

- Typically service centers establish different rates for internal and external users
  - **Internal users**, including those directly charging service to sponsored agreements, are typically charged the break-even direct cost rate. Internal users should not be charged less than the break-even rate unless the center is supported by an institutional or departmental subsidy

  - **External users** may be charged a higher billing rate. This rate is often determined based on the market rate for that particular service or calculated by adding the negotiated on-campus organized research F&A rate to the break-even rate

Challenges & Considerations

Challenges & Considerations

Separating Services and Tracking Usage

High performance computing operations may also face some unique challenges, including:

- **<u>Should institutions charge for these services?</u>**
    - Subsidize this operation?

- What costs should be included in the billing rates?
    - What should be the rate base?

- What constitutes a specific "service" and how can the costs for each be separated?

Challenges & Considerations

Separating Services and Tracking Usage

- Is it possible to clearly define what percentage of a specific piece of equipment cost can be allocated to a particular service provided?
  - For example, is one server or cluster used specifically for one type of service?

- Are there technical units of measurement (I.E. hours of server usage) that can be used for each service?

- What protocols can be used to monitor system usage? Are these protocols currently in place or would there have to be changes made to the system in order to implement them?

- What is the best way to allocate the time of the staff to each service?

Challenges & Considerations

Accounting Practices

- Does your institution require service centers to establish an operating account for service centers?

- Does your institution have defined limits for an allowable working capital balance that can be maintained for operations?

- Is it possible to proactively track the balance of the revenue and expenses to ensure that the center is not generating an excessive surplus or deficit?

- Are there ways to separate revenue from internal and external users?

- Do all costs included in the billing rates adhere to the cost principles of the Uniform Guidance?
    - Reasonable
    - Allowable
    - Consistent
    - Allocable

Challenges & Considerations

Considerations for F&A Proposal

- **Space**- Difficult to classify space as organized research in space survey without the ability to track sponsored projects to support the classification
  - May be combined with other general IT infrastructure support

- **Equipment Depreciation**- Equipment depreciation can be **either** included in the billing rates for a service center **or** included in the F&A rate proposal, but not both
  - Can be difficult to track equipment that included is in billing rates to ensure that it is excluded from the F&A proposal
  - Costs are only recovered fully through billing rates if the appropriate rate is charged to customers

- **Administrative Cap**- Many institutions align performance computing with general IT costs, which typically fall under general administrative (GA) costs in the proposal.
  - Limited benefit to the on-campus OR rate as an administrative cost

THANK YOU

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