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Cloud Trend towards IT-as-a-Service and in Education

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Agenda

- Citrix introduction

- Cloud trend -- journey towards IT-as-a-Service

- Why education is adopting cloud computing

- Cloud solutions and education customer successes

- Where to begin and summary

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By the numbers…

- $2.5B+ revenue
- 8,000+ employees
- 250,000+ customers
- 10,000+ partners in 100 countries

- #1 Desktop & App virtualization
- #2 Cloud Networking
- #1 Public Clouds
- #2 Web Collaboration

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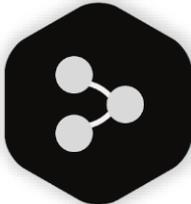# Citrix growth and evolution
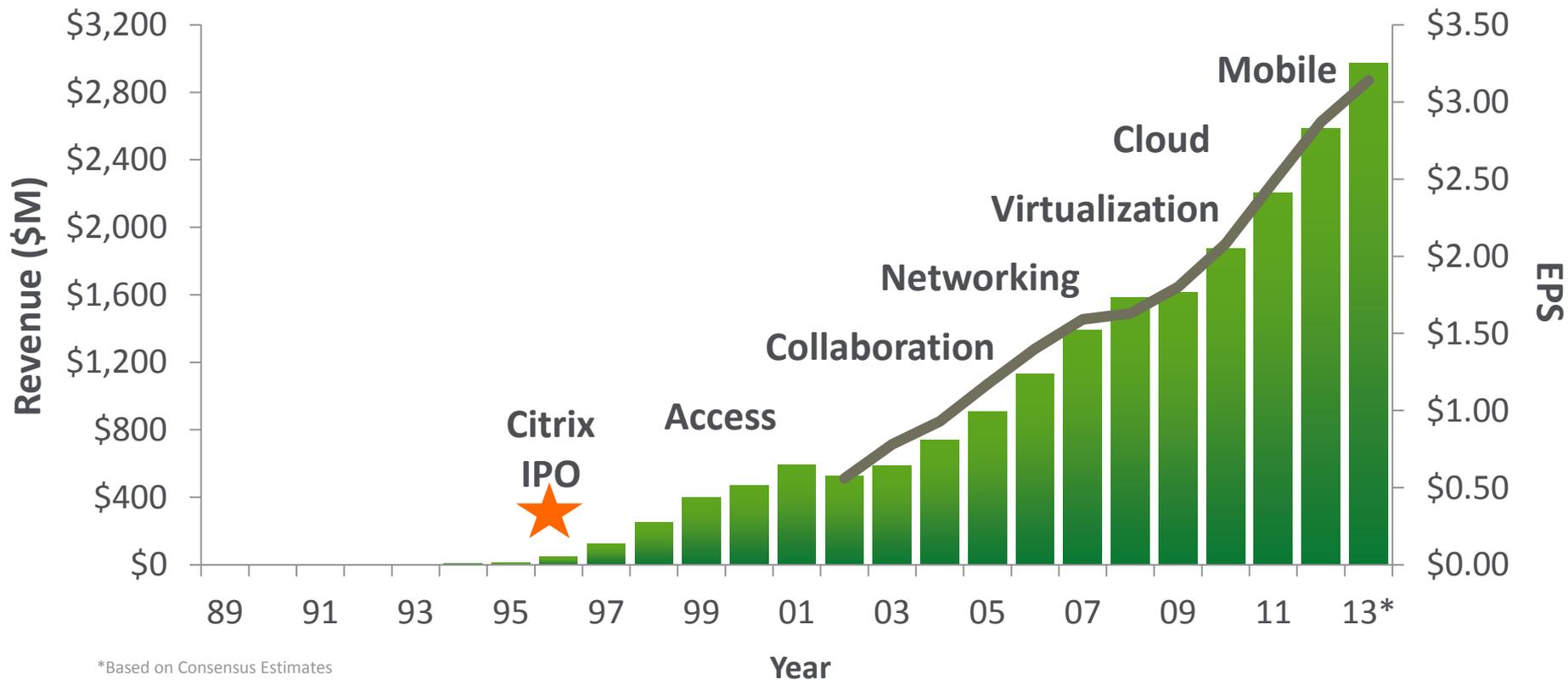
*Based on Consensus Estimates

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Total Revenue — **Adjusted EPS**

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Diverse, High-Growth Product Portfolio

| Social Collaboration | Data Sharing | Enterprise Mobility | Windows as-a-Service | Cloud Networking | Cloud Platforms |
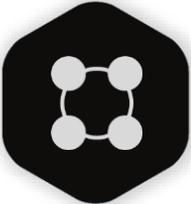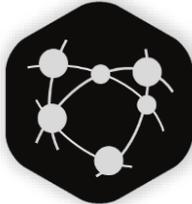
20%   **59%**   **21%**

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200+

**Large Scale
Production Clouds
In Deployment**

40,000+

Servers at scale

Service Providers and Telcos

kt · TATA · BT · orange · NTT Communications

kommune e informationsverarbeitung baden-franken · IDC Frontier · KDDI · Alcatel·Lucent

DATAPIPE · 中国电信 CHINA TELECOM · SUNGARD · SOFTLAYER

EVRY · T Slovak Telekom · Taiwan Mobile

Web 2.0

Spotify · edmunds.com · InMobi · Trader Media Group

Enterprise and Education

NOKIA Connecting People · Autodesk · amdocs · TOMTOM · Disney INTERACTIVE

SAP · HOKKAIDO UNIVERSITY FOUNDED 1876 · KYUSHU UNIVERSITY · THE UNIVERSITY OF MELBOURNE

The journey towards IT-as-a-Service

But cloud is about more than just IaaS…

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Bigger goal is to enable self-service delivery of any cloud-based service

"a cloud is not a cloud unless the consumers of those services can trigger their deployment on their own."

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Paradigm shift for IT
IT as Innovator, Service Provider, and Business Driver

"BUILD & OPERATE"	"AGGREGATE & DELIVER"
Back Office	Self-Service Storefront
Limited Apps	Any App, Public/Private
Dedicated Infrastructure	Elastic Infrastructure
Low Utilization	High Utilization
Days to Weeks	Immediate
Low Visibility	High Visibility
IT Role: Technology	IT Role: Business

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IT-as-a-Service (ITaaS)

IT brokers cloud services, acts as Service Provider

Students, faculty, researchers & staff

IT Developers and Cloud Admins

IT Managed Cloud Services Broker

Authentication and role based authorization

- Self-Service
- Discovery
- Service Catalog
- Billing
- Chargeback Showback

Public/ 3rd Party Web, SaaS apps

GoToMeeting, Office365, ShareFile

Public/ 3rd Party Clouds

Amazon, MSFT Azure, Google, SoftLayer, Datapipe

Private Cloud

Applications (Blackboard, Exchange, in-house), IaaS, STaaS, DaaS

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The Journey to ITaaS

IT OPERATIONS

AUTOMATED

MANUAL

Most IT Organizations are Here

Storage, Compute, Network

Server Virtualization

App & Desktop Virtualization

Cloud Orchestration
Public & Private IaaS

Multi-Service Broker
DaaS
RaaS
SaaS
PaaS
STaaS
IaaS

IT as a Service
Infrastructure
Apps
Workloads
Services

VIRTUALIZATION

CLOUD

IT ONLY

DEPARTMENTAL

ALL

BUSINESS IMPACT

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Why Education is adopting cloud computing

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Ranking

Innovation
Research
Virtual facilities

Attracting students, researchers and funding

Retaining teaching staff

Administration

Improving efficiency
On-demand delivery
Reducing OPEX

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Public vs. Private Clouds

- Public Clouds
  - Flexible
  - On-demand
  - Pay as you go
  - Data outside IT control

- Private Clouds
  - Leveraging existing investments
  - Predictable cost
  - Security, policy and governance under IT control

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Sample EDU Use Cases

Research

Unfettered grant-funded research with separate access for length of project. Researcher determined exotic mix of OSs, networks, storage and capacities.

Sample EDU Use Cases

Business / IT

Consolidation and streamlining of infrastructure, policy and governance with support for legacy applications and cloud-era apps. Usually policies around advanced security, back-up and DR to ensure research data protection

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Sample EDU Use Cases

Faculty-based Computing

Self-service access to pre-allocated spend and amount of compute, networking and storage resources available for the class year

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Sample EDU Use Cases

Student Tools/workspaces

Self-service, private, personal, online workspace (class labs, materials, exercises) for duration of student experience

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Sample EDU Use Cases

Industry Collaboration

Private and collaborative access for industry-funded research projects

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Citrix cloud solutions and Education customer successes

Citrix CloudPlatform
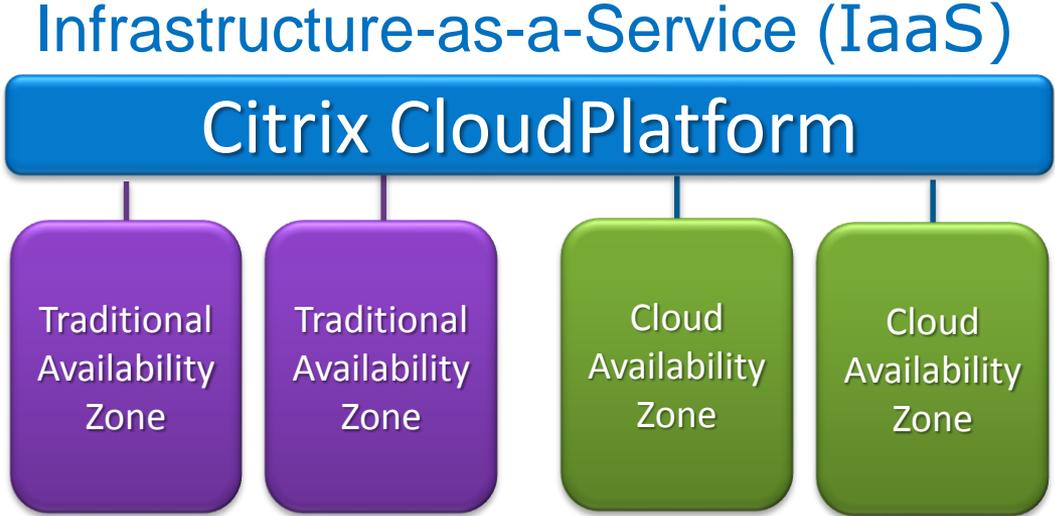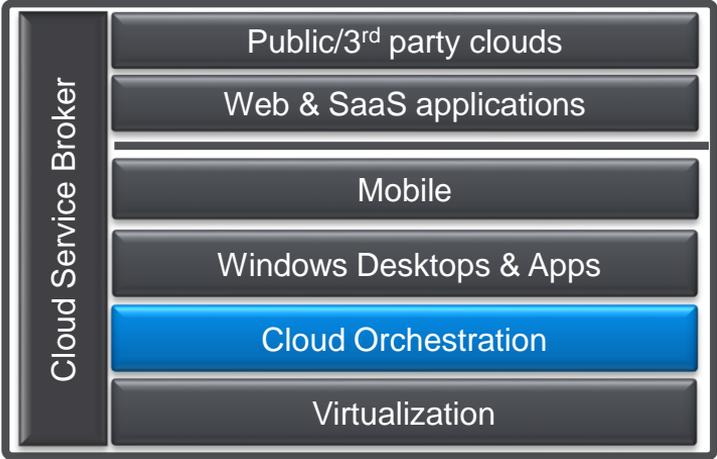## powered by Apache CloudStack

Mature Complete Product

- Complete infrastructure orchestration and management
- Enables any organization to deliver Amazon style clouds in days not weeks or months
- Unlike other cloud solutions, supports both traditional enterprise and cloud workloads
- Integrated turnkey solution
- Open source, powered by Apache CloudStack

Proven Cloud Solution

- Scales to over 40,000 servers
- 200+ Production Clouds
- 1000+ Open Source community members and Citrix Ready Cloud ISV Partners

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Uniquely supports multiple workloads

Cloud Service Broker
- Public/3rd party clouds
- Web & SaaS applications
- Mobile
- Windows Desktops & Apps
- Cloud Orchestration
- Virtualization

Infrastructure-as-a-Service (IaaS)

Citrix CloudPlatform

- Traditional Availability Zone
- Traditional Availability Zone
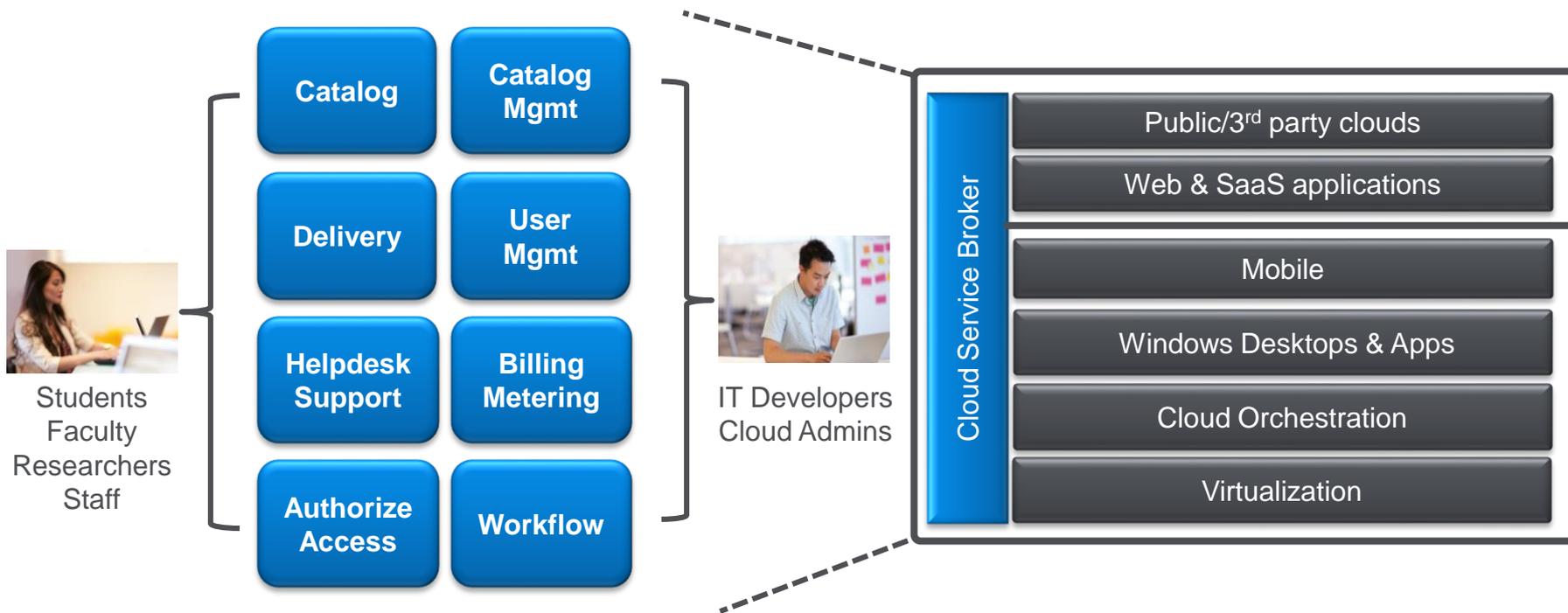- Cloud Availability Zone
- Cloud Availability Zone

CloudPortal
Business Manager

- Cloud Services Delivery and Management Platform

- Enables IT to become a Service Provider and broker cloud services

- Empower Users w/ Self Service IT

- Enables governance and real-time visibility

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CloudPortal Business Management Features

Catalog

Catalog Mgmt

Delivery

User Mgmt

Helpdesk Support

Billing Metering

Authorize Access

Workflow

Students
Faculty
Researchers
Staff

IT Developers
Cloud Admins

Cloud Service Broker

Public/3rd party clouds

Web & SaaS applications

Mobile

Windows Desktops & Apps

Cloud Orchestration

Virtualization

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Education Use Cases

✓ **Research**

Business / IT

Faculty-based Computing

Student Tools/workspaces

Industry Collaboration

> **First Step – Infrastructure as a Service**
> **Self-service research cloud**

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University of Melbourne Challenges

Government funded Research

- Research Cloud use case
  - For grant-funded researchers
  - Provide private or collaborative workspaces
  - Able to conduct unfettered research
- Research Cloud workspace size spun-up based on
  - Research funding
  - Technical requirements
  - Period of use

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University of Melbourne

Self-service	**CloudPortal**
IaaS	**CloudPlatform**
Virtualization	**VMware**

Research Cloud
Security
Remote
Backup

Results

- On demand
- Rapid turnaround
- Leverages Central IT shared resources
- Resources easily returned to shared pool

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Education Use Cases

Research

✓ **Business / IT**

✓ **Faculty-based Computing**

Student Tools/workspaces

Industry Collaboration

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Video

University of São Paulo

http://www.citrix.com/tv/#videos/8838

University of Sao Paulo Challenges

- Size
  - 100,000 Students
  - 6,000 Professors
  - 17,000 Employees
  - 32,000 Sq mi buildings
  - 9 cities; 11 campuses
  - 54,000 PCs

Goals
- Provide physical security
- Provide logical security
- Provide infrastructure
- Provide virtual DCs
- Provide broad access
- Provide scalability

- Motivations!
  - 100+ Decentralized Datacenters
  - Some have UPS System
  - Some have Power Generator
  - Some have Climate control (some not DCs)
  - Some follow standards

Started in Jul, 2012

- Inside the Datacenters
  - Legacy servers
  - Some are updated
  - Decentralized Data
  - Data on internal disks
  - Some have backup policy
  - Some have a disk protection

Had to **finish** by *January 25th, 2013*

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Solution: *Cloud USP*

- Standardized on XenServer and NetScaler

- Moved existing workloads on top of CloudPlatform

- Deployed CloudPortal for self-service, catalog and metering
  - Rich catalog of Windows, Linux, SQL VMs

- Virtualizing desktops and apps with XenDesktop, XenApp

- 3 use case zones
  - Admin Zone – IT delivered services
  - Shared Zone – Student usage
  - Private Zone – Dedicated private cloud
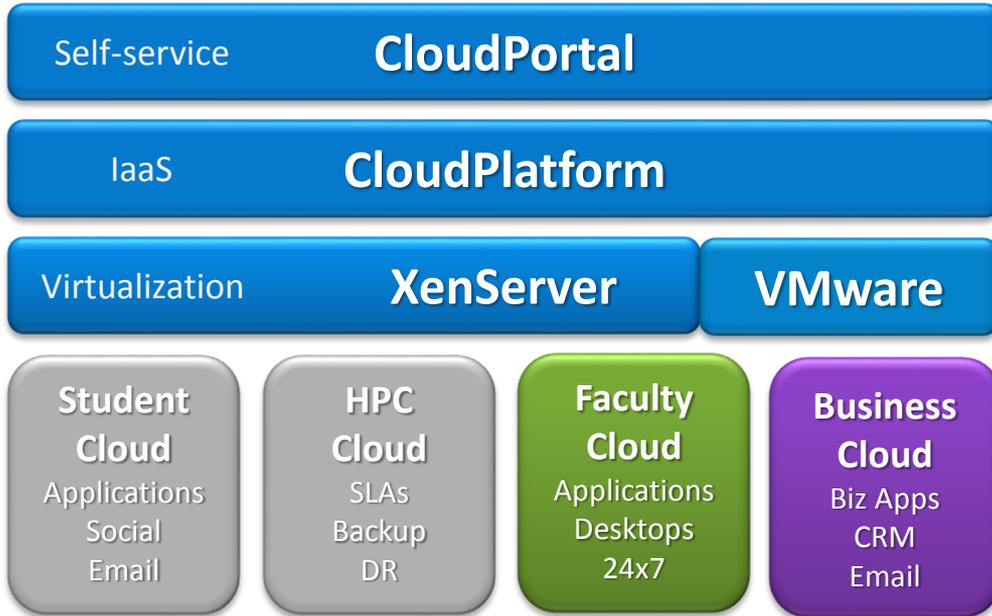
- Faculty spend limit, show-back metering

Future

- All new IT projects will be deployed in Cloud USP

- Enable ITaaS delivery model for all services

Cloud USP

Self-service	**CloudPortal**	
IaaS	**CloudPlatform**	
Virtualization	**XenServer**	**VMware**

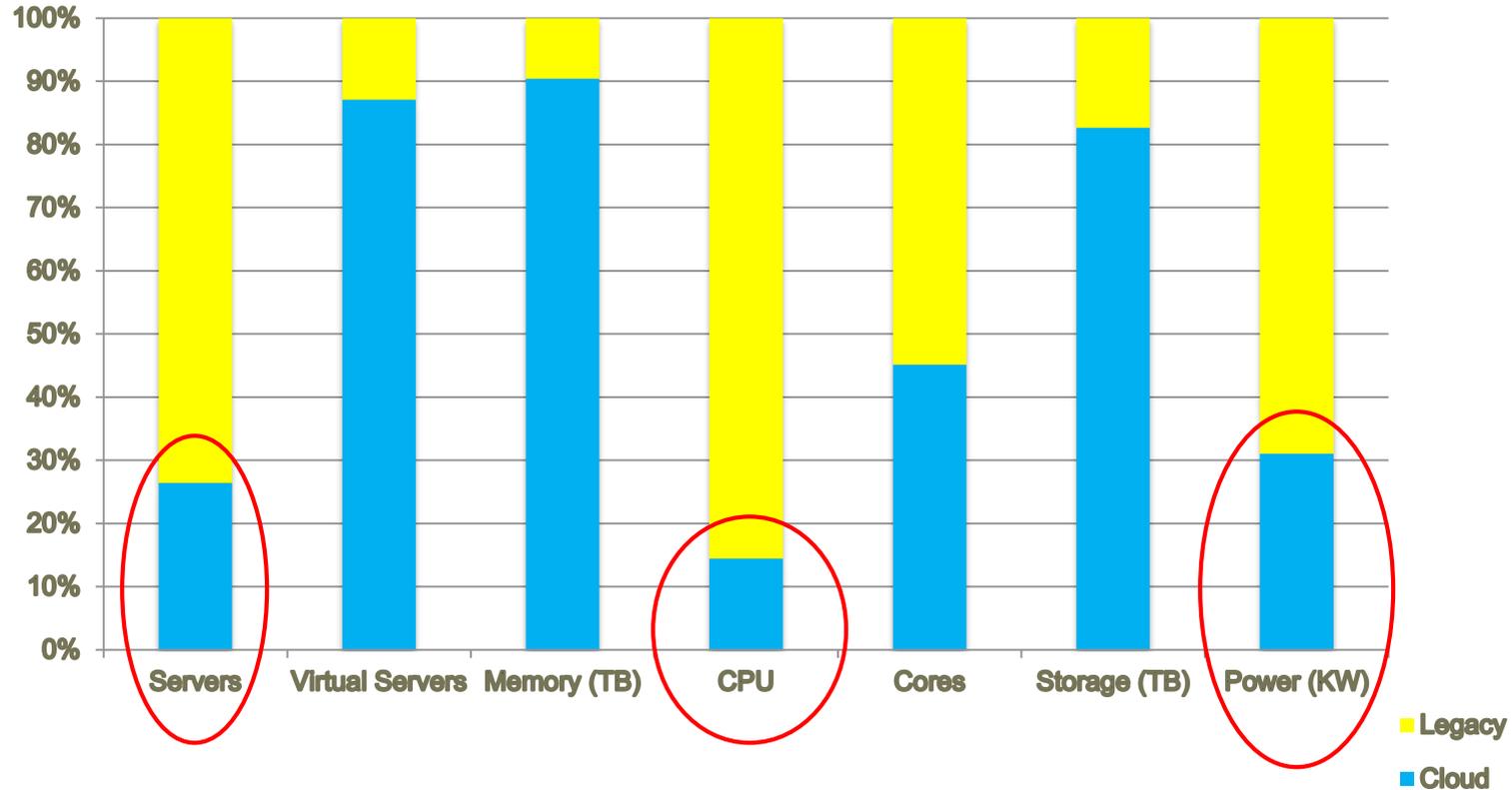| **Student Cloud**	**HPC Cloud**	**Faculty Cloud**	**Business Cloud**
Applications Social Email	SLAs Backup DR	Applications Desktops 24x7	Biz Apps CRM Email

Results

- Consolidated DCs
- Streamlined Operations
- Consistent business policy
  - Security
  - Back-up
  - Disaster Recovery
- Cost control
- Self-Service
- Enhanced Student experience
- On-time delivery Jan 25, 2013

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Cloud USP Numbers

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EDU Use Cases

Research

Business / IT

Faculty-based Computing

✓ **Student Tools/workspaces**

✓ **Industry Collaboration**

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RMIT UNIVERSITY

Challenge

- Computer labs did not meet student requirements: limited hours and capacity
- Researchers wanted self-service provisioning of HPC apps

Goals

- Provide "Anywhere, Anytime Student Computing"
- Align IT with new collaboration based facilities and methods

Solution

- *myCloud* built with CloudPlatform and CloudPortal
- Self-service, private workspace for enrollment lifespan
- *RMIT Bucks* for cloud usage spend ("bucks" is money)
- Separate Infrastructure Zone for HPC, Students, and IT

Challenges

- Student cloud for RMIT University students
  - Private personal online workspace for class labs, materials, and exercises
  - For the duration of their enrollment at RMIT

- Infrastructure Cloud for RMIT IT
  - Provide a dynamic, flexible capability to develop, QA and deploy centrally managed business applications

- Research / Industry Cloud for grant-funded RMIT researchers
  - Provide private or collaborative workspaces
  - Ability to conduct unfettered research
  - Create multiple virtual private clouds (VPC)
  - Need a variant for projects with corporate-funded partnerships for commercial development purposes

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RMIT
UNIVERSITY

Self-service	**CloudPortal**
IaaS	**CloudPlatform**
Virtualization	**XenServer**

Student Cloud	**Research Cloud**	**Industry Cloud**	**Business Cloud**
Applications	SLAs	VPC	Biz Apps
Social	Backup	VPN	CRM
Email	DR	Biz Policy	Email

Results

- Ability to deliver unique capabilities for student experience
- Central IT can develop applications while following the Software Development Life Cycle
- Rapid turn-around for Research clouds
- Ability to create industry collaboration clouds

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So how do you get there?

Start by…

- Discussing with other universities and education institutions about their cloud directions and initiatives

- Engaging with the Open Source Community – Apache CloudStack

- Talking to Citrix about our cloud experience and expertise

- Embarking on an assessment and pilot

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Summary

- Cloud in Education:

  - Deliver everything via Self-Service

  - Consolidate infrastructure

  - Enforce business policy

  - Manage all levels of usage

  - Help to improve rankings and streamline administration

Thank you for attending

Questions?

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Work better. Live better.