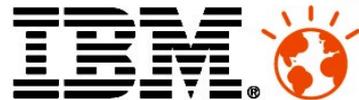# Enterprise Computing Community Conference 2012

Leveraging Cloud Technology to Support Enterprise Computing Education

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Abstract

One of the most frustrating aspects of learning Enterprise Computing is simply finding a way to access and use Enterprise Computing systems. This lack of accessibility severely stifles potential innovation for the platform as well as reduces greatly the number of people who will be familiar with Enterprise Computing as they enter the workforce. In this session, learn how new deployment models for using cutting-edge Enterprise Computing application development tools, leveraging cloud-based environments, can bring Enterprise Computing systems to a large and hungry population of students, faculty, and practitioners. A cloud-based application development environment, or sandbox, can break down the current "barrier to entry" to accessing Enterprise Computing systems, allowing a larger audience to learn, work with, play with, and advance these systems.

Agenda

■ Past – THE mainframe system

■ Present – Everyone loves The Cloud

■ Future – A perfect combination
  – virtualized Enterprise Computing systems
  – available quickly and easily
  – without the fuss

THE Mainframe System

■ Shared Resource
- A handful of partitions run system "images"
- Individually administered/managed
- Users connect to and use
- Multiple users share usage

■ Complications
- Changes can be slow to implement
- Reservations for machine time
- Though there is strong isolation, users may impact one another

Partition

Partition

Partition

Mainframe
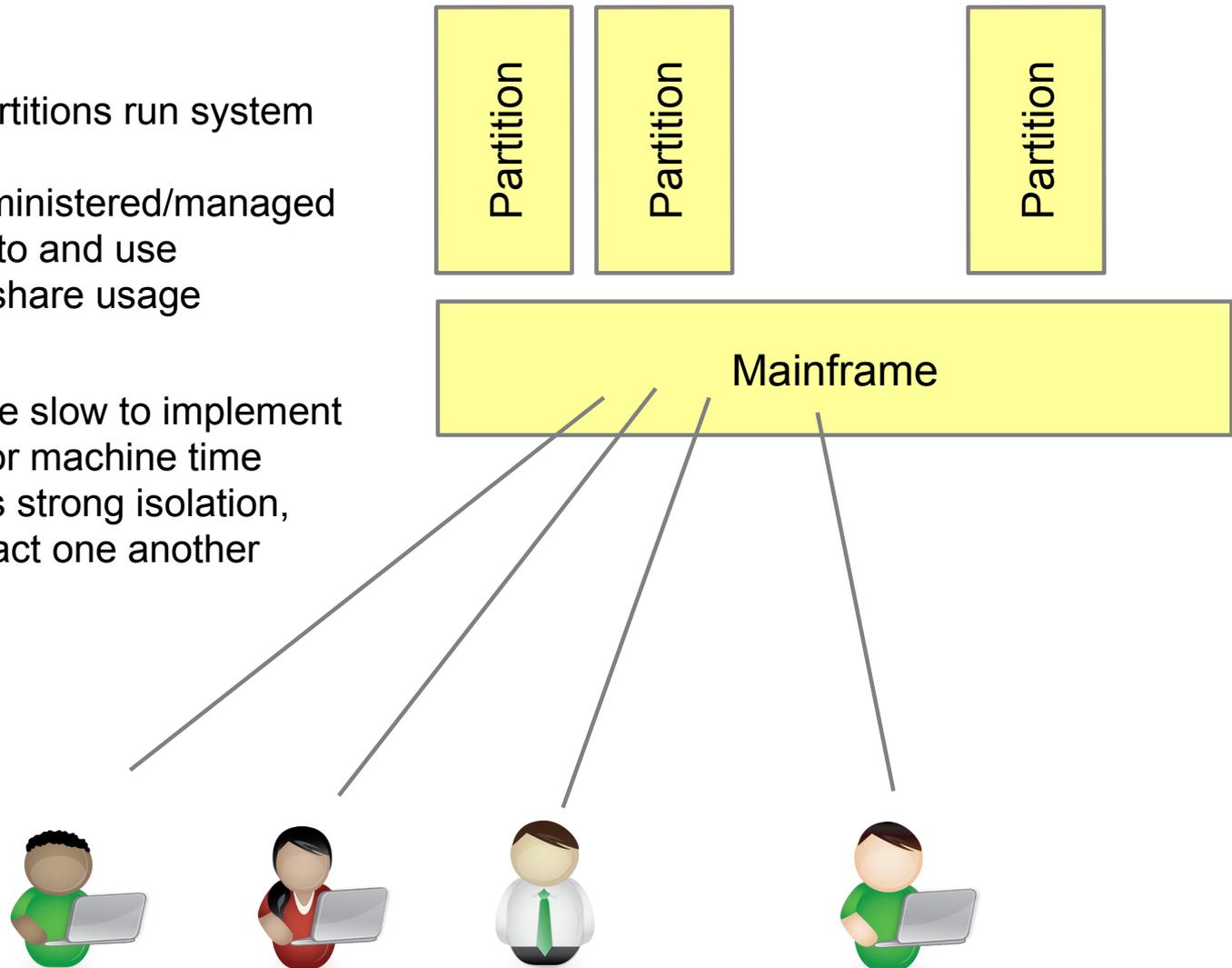
Benefits of Enterprise Computing

- Someone else manages the infrastructure

- System is always available

- Connect to it from anywhere

- Centralized computing element

- Security, both physical and provided by the environment

- Workload management and self-tuning of resource usage

- Mixed workloads to sustain high CPU utilization rates

- Tuned to the task of handling large amounts of data

Frustrations with Enterprise Computing

- Finding a system – or time on a system is hard!

- Have to work for the right company
    - or go to the right school
    - or know the right friend

- Some organizations have limited resources for development
    - Inhibits new application development
    - Slows down response to requirements
    - Production workload always takes priority
        - great for the business
        - frustrating for development

- Changes to configuration can take a long time
    - Usually for very good reasons – big impact of any problems encountered
    - Lots of process around configuration change
    - Changes may impact many users
    - Centralized control of every system instance

Cloud Envy – Everyone loves the cloud

- Easy (and cheap) access
  - Browser-based requests
  - Simple setup
  - On demand availability
  - Manage "images", roll out "instances"

- Impression of limitless resource
  - Over-commit possible
  - Response time acceptable
  - Highly publicized successes

- … and challenges too
  - Image proliferation
  - fix/service application
  - Idle systems using resources

image

catalog

System instance
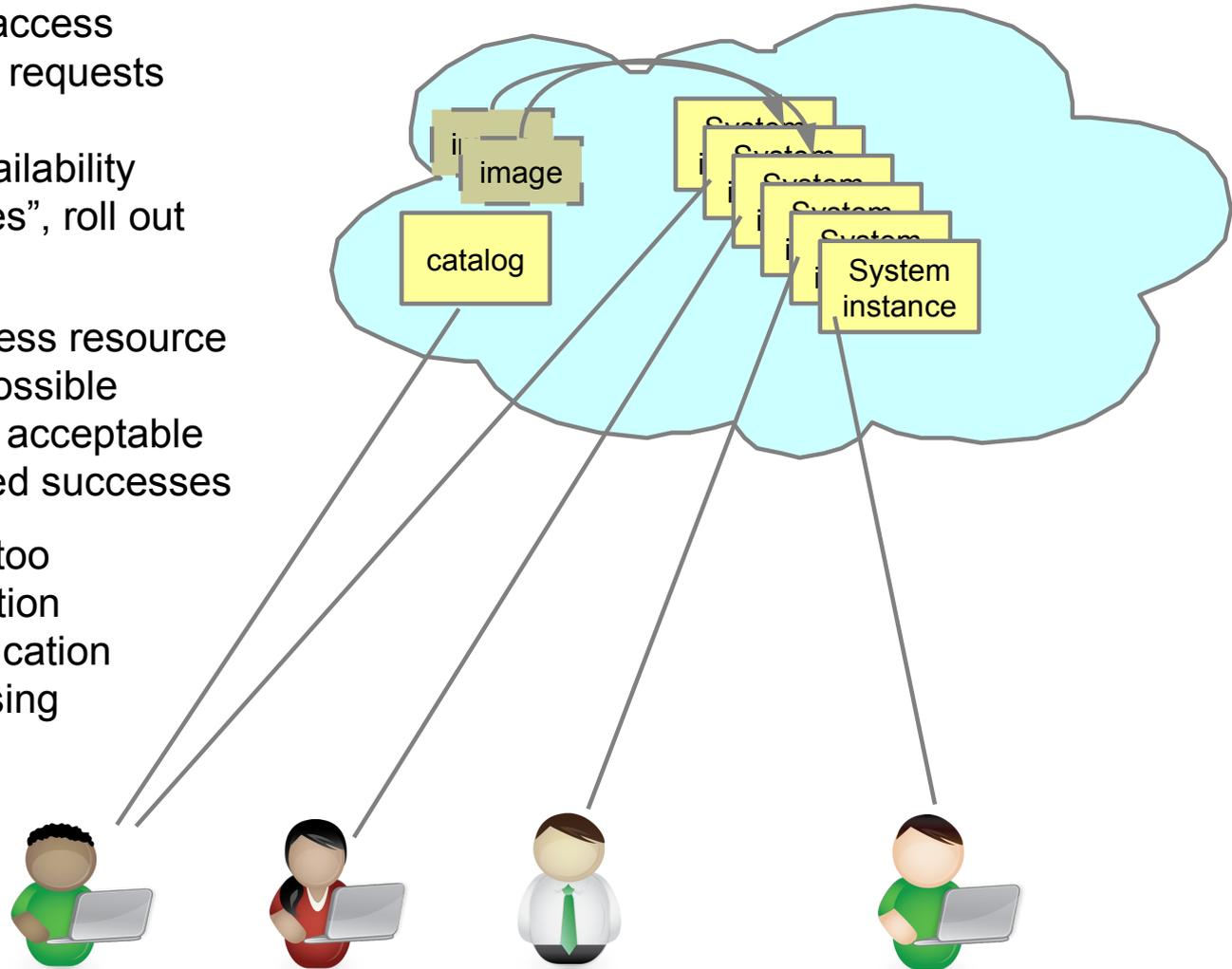
Cloud-based environments benefit many

- Business

- Individuals

- Start-ups

- Education
  - Faculty
  - Students

Easy access to resources

- Avoid high initial investment

- No purchase of physical equipment or facilities

- Try/test before purchase

- Use only for limited time

- Pay as you go (PAYG)

Cloud encourages exploration

- Try out ideas

- Low impact of an incorrect choice or setting

- Take advantage of others' work
  - Capture best practices
  - Build on tested configurations

- Share systems

Remote access paradigm

- Use network connected model

- Makes interacting with a remote system more familiar

Easy reset

- Restart instance or delete instance

- Restore to previous good/known configuration

Recently: Infrastructure as Code

■ Enable creation of complex environments through a set of operations

■ Instantiate based on a set of steps

■ Infrastructure described by that set of steps (or "program")
  – "Infrastructure as code"

■ Version control added to this environment creates versioned infrastructure

Enterprise Computing – meet the Cloud

- Cloud Computing prepares people for Enterprise Computing
  - Remote access
  - Multiple computing platforms
  - Access many different configurations

- Enable access to Enterprise Computing Systems
  - Create system images
  - Maintain images, not instances
  - Setup for separation of data from system

- Best of both worlds
  - Ease of access and low barrier to entry for development
  - Mitigate the tension between operations and development

image

catalog
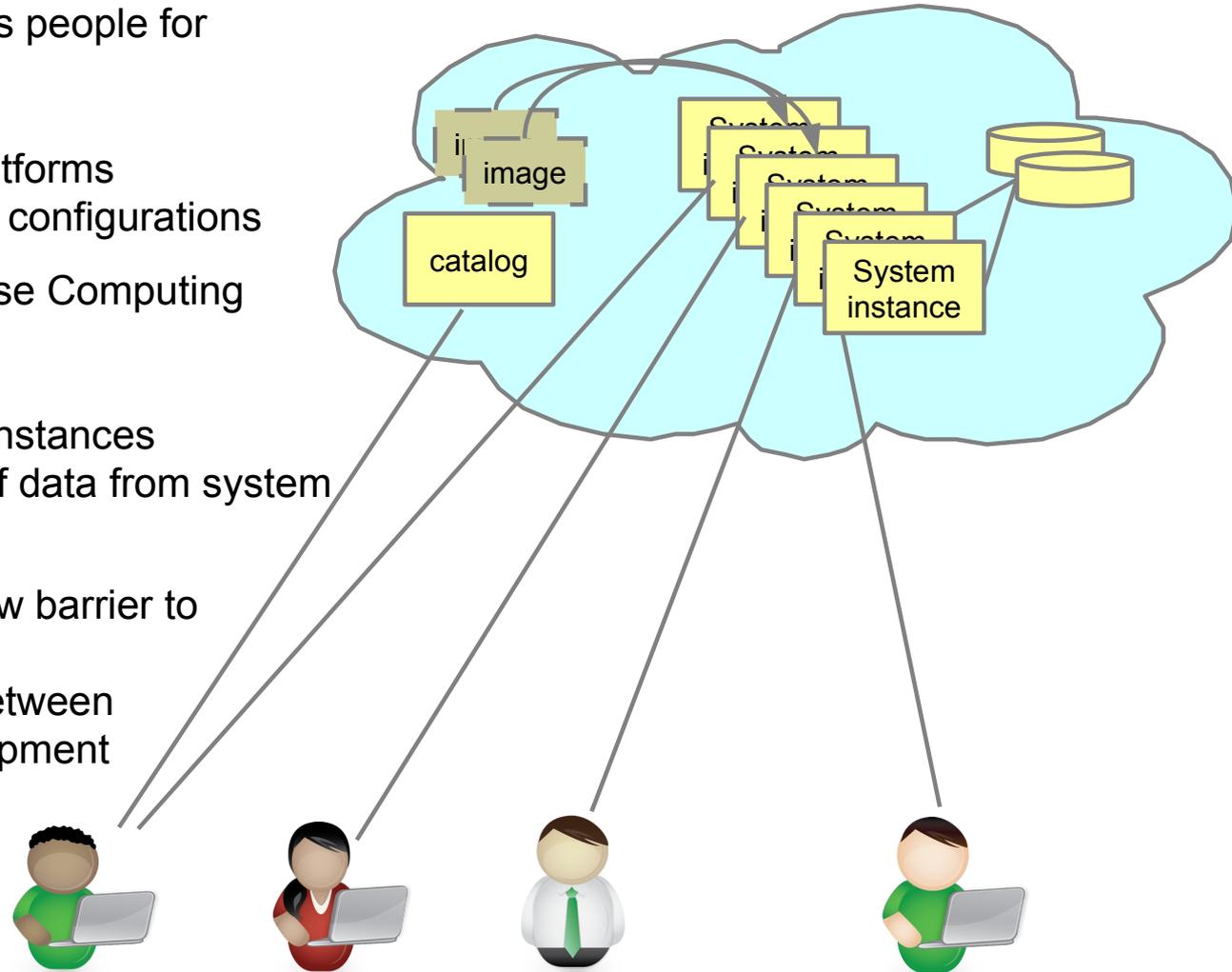
System instance

Manage the Image, not the Instance

- We have used virtualization for many years

- Management of each (running) system image, with a unique configuration for each

- Cloud technology allows us to manage the template or image

- Instantiate a system instance, based on a image

- Treat the running system as a temporary resource

Manage data separate from Systems

- Persist information across start/stop of instances

- Share information between running instances

- Retain information across changing the system image

Rational Enterprise Modernization Cloud Solutions

Characteristics

- Composable for different needs
- Traditional access (e.g. 3270 and ISPF)
- Modern access (e.g. Using IDE, automated build/test tools)

Basic NX Client

ISPF Client

Web Browser

RDz

CLM 2012 Server

RTC Client

RDz

RDzUT System

RTC zOS Build

RTC / RDz Intg

RDzUT Server

Cloud image

Product feature
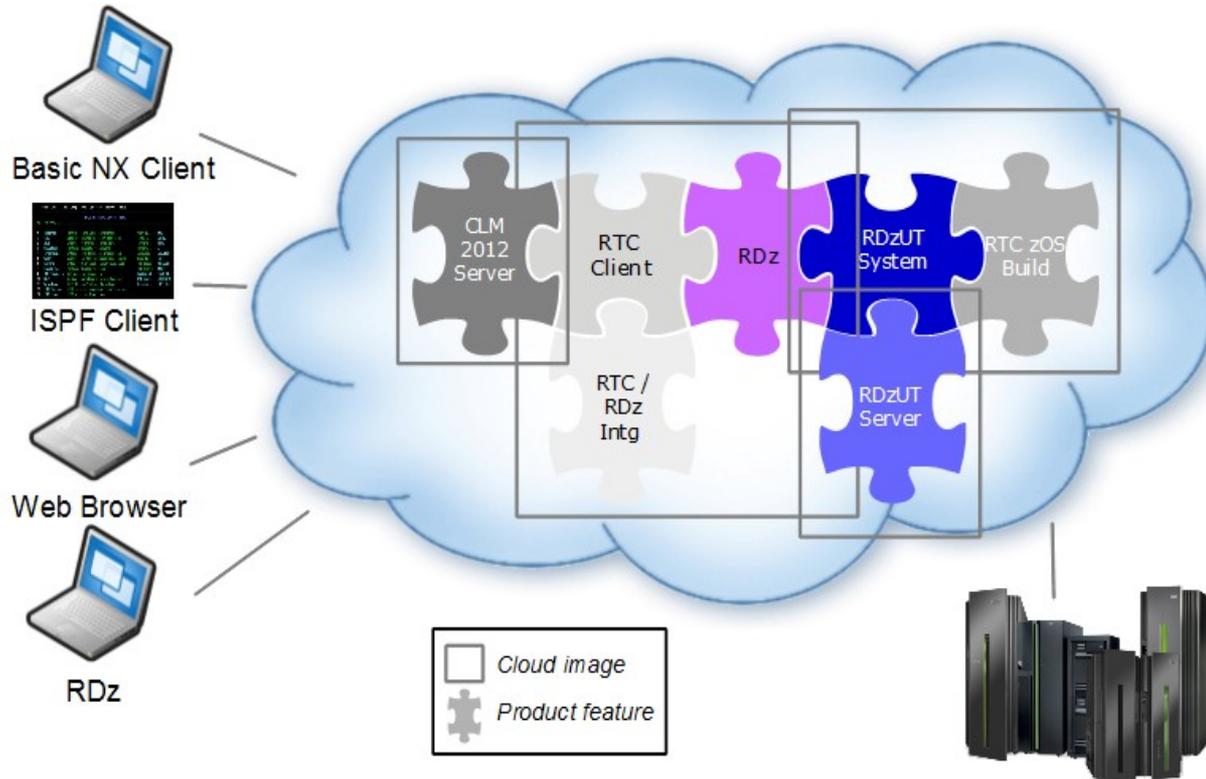
Easy to use

- Select from catalog
- Start up
- Use for project
- Return on completion
- Access mainframe development environment from anywhere

Rational EM Cloud Solutions – *possible application in education*

1 *Team lead/Faculty* **requests instances of a Rational EM application development solution (CLM+RD&T+RDz)**
　　- RTC Build services started

3 **Project & applications setup (applying best practices) – updated images &** *Team lead/Faculty* **updates**

11 *Team lead/Faculty* **requests deployment of built application to systems using RTC**

4 *Student* **requests an instance of RDz desktop tools combined with the solution**

5 *Student* **submits projects for the class, sharing them with the rest of their team using RTC**

2 CLM
RD&T
RDz

EM Cloud solution realization

RD&T test image realization

6 **Builds the updated enterprise application on RD&T system + Creates** *reference test image* **containing the newly built application**

8 RD&T

7 *Tester/Student* **requests an instance of RD&T from** *reference test image*
　　- req. applications services started (CICS/DB2/WAS/...)
Prepares test data:
　　- from cloud storage, or
　　- from on-premise systems

9 **RD&T test instance gets removed**

19

Enterprise Cloud computing in Education

- Provide access to systems historically hard to access

- Use for forensics, history, understanding

- Use small virtual instances to allow for self study and exploration

- Easy reset encourages educated risk taking

- Manage at image level allows faculty to set initial conditions

- Remote access enables world-wide participation

- Prepare students for further study or careers by using a variety of systems

Summary

- Cloud Computing is a major advance in computing
  - Teaches the benefits of remote access
  - People learn to work with multiple systems
  - Enables the usage of the best tool for the job
  - Opens up access to many environments

- Cloud Computing augments and enhances Enterprise Computing Education
  - Provides quicker access to virtual systems
  - Enables access to a wider range of computing systems
  - Encourages experimentation and exploration
  - Allows teams to quickly setup lab/test environments
  - Easy reset and return to initial conditions

- Enterprise Systems and Cloud Computing
  - Students prepared for multi-platform solutions
  - Faculty enabled for quick establishment of many environments
  - Businesses able to use fit for purpose systems

More information on zEnterprise

- IBM zEnterprise / System z Redbooks Portal: http://www.redbooks.ibm.com/portals/systemz

- IBM zEnterprise Announcement Landing Page: ibm.com/systems/zenterprise196

- IBM zEnterprise HW Landing Page: ibm.com/systems/zenterprise196

- IBM zEnterprise Events Landing Page: ibm.com/systems/breakthrough

- IBM Software: ibm.com/software/os/systemz/announcements

- IBM System Storage: ibm.com/systems/storage/product/z.html

- IBM Global Financing: ibm.com/financing/us/lifecycle/acquire/zenterprise/

- Global Technology Services:
  http://www.ibm.com/services/us/index.wss/offerfamily/gts/a1027714

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