Virtual Computing Infrastructure

Information Technology
Academic Tech Day – Feb. 15, 2011
http://titancloud.fullerton.edu
CSU Fullerton – VCL Implementation Team

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• Sepehr Sobhani, VCL Image Deployment (ssobhani@fullerton.edu)
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• Amir Dabirian, VPIT / CIO (adabirian@fullerton.edu)
• Rommel Hidalgo, Infrastructure Services (rhidalgo@fullerton.edu)
• University Data Center
• Server Infrastructure
• Network Infrastructure
Integrated Technology Strategies

CSUF Information Technology Governance

- ERP
  - Data Mining, Data Warehouse, Business Process Re-engineering, etc.
- Social Networking
  - Social Media & Collaboration
- Infrastructure
  - Virtualization, Cloud Computing, etc.
- Enterprise Portal
  - Mashups, Interface, Dashboard, etc.
- Academic Technology
  - Virtual Computing Lab, Online Education, etc.
- Support/Training
  - Field & Phone, Classroom, Online, etc.
- Access
  - Laptop, Desktop, Mobile Devices, Computer, etc.

Sustainable
Collaborative
Visionary

Information Security

Accessible Technology
CSUF
Integrated Technology Strategies

“The Integrated Technology Strategies are a set of interrelated information technology strategies that are visionary, collaborative, and sustainable while maintaining compliance and security.”

These strategies are designed to meet the missions and goals of the University through campus-wide Information Technology Governance.
Cloud Computing

The set of disciplines, technologies, and business models used to deliver IT capabilities (software, platforms, hardware) as an on-demand, scalable, elastic service.
Infrastructure Strategy

• Cloud Computing
  – Public and Private Cloud (VCL) Strategy
  – Cloud Computing planning tool for deployment of servers into:
    • Server Virtualization Infrastructure
    • Amazon Cloud
    • Other Cloud Providers (i.e. IBM, Unisys, …)

• Virtual Desktop and Virtual Lab Infrastructure
Infrastructure Committee

Chair: Chris Manriquez

Charge:

The Infrastructure Task Force will advise the VP of IT on policies and processes related to IT infrastructure such as services and resources, impacts of potential upgrades including planned outages, and recommendations for future infrastructure technology investments.
Infrastructure Committee
Chair: Chris Manriquez

Members:
- Chris Manriquez, Chair (Information Technology)
- Elahe Amani (Student Affairs)
- Welson Badal (Administration & Finance)
- Jeffrey D. Cook (Strategic Communications)
- Rommel Hidalgo (Information Technology)
- Mike Marcinkevicz (Information Technology)
- Willie Peng (Information Technology)
- Raman Unnikrishnan (College of Engineering and Computer Science)
- Ira Unterman (University Advancement)

Assoc. Deans:
- Mitchell Avila (HSS)
- Susamma Barua (ECS)
- Mark Filowitz (NSM)
- Terry Grant (MBE)
- Elizabeth Housewright (Library)
- Karen Ivers (Ed.)
- Melody Johnston (UEE)
- Kathy Koser (HHD)
- Irene Matz (Comm.)
- Claire Palmerino (HSS)
- Kim Tarantino (MBE)
- James Taulli (Arts)
Infrastructure Committee
Chair: Chris Manriquez

Members (cont.):

Campus Techs:
- Gary Chang (CS)
- Daiyu Hayashi (MBE)
- Ross Jones (Arts)
- Jason Lorge (Comm.)
- Anh Lu (HHD & Ed)
- Mitch Pautz (HSS)
- Brad van Mourik (NSM)
CSU Fullerton VCL Sizing Requirements

• Hardware estimate of concurrent users
  o **Dell PE1955 Blades**: 12 Concurrent Guest Images
    ▪ Running VMWare ESXi 4.1 Hypervisor
  o **Dell Optiplex 740 Workstations**: 3 Concurrent Guest Images
    ▪ Running VMWare ESXi 4.1 Hypervisor
  o **Mac Pro**: 6 Concurrent Guest Mac OS X Images
    ▪ Running VMWare ESXi 4.1 Hypervisor
    ▪ IRAPP RDP Server
CSU Fullerton VCL Implementation Hardware

VMWare ESX 4.1 Hypervisor (VCL Manager, VCL DB, VCL Web):

- **Hardware**: Dell R910; RAM: 128 GB; CPU’s: 2 sockets (6 core ea.)

- **VCL Manager**
  - CentOS, VCL 2.2, Perl

- **VCL Web**
  - CentOS, Apache Web Server, PHP

- **VCL DB**
  - CentOS, MySQL

- **Storage**: NetApps FAS3140 + DS4243 Shelves
CSU Fullerton VCL Implementation Hardware (Continued)

VMWare ESXi 4.1 Hypervisor (VCL Guest Images):

- **Hardware**: Dell PE1955; RAM: 32 GB; CPU’s: 2 sockets (2 core/socket); 60 GB HDD
- **Max # of VCL Guest Images per machine**: 12
- **Projected Quantity of Dell PE 1955 machines**: 40
- **Total Concurrent VCL Guest Images**: 480
- **Currently have 25 PE 1955 machines up**: 300 Nodes
CSU Fullerton VCL Implementation Hardware (Continued)

VMWare ESXi 4.1 Hypervisor (VCL Guest Images on Workstations):

- **Hardware**: Dell Optiplex 740; RAM: 8 GB; CPU: AMD 4600+
- **Max # of VCL Guest Images per machine**: 3
- **Projected Quantity of Dell 740 machines**: 200 - 500
- **Total Concurrent VCL Guest Images**: 600 – 1500
- **Currently have 120 Dell 740 machines up**: 360 Nodes
- **Currently have plans to also use machines for sandbox environment for faculty research**
Dell 740’s
CSU Fullerton VCL Implementation Hardware (Continued)

VMWare ESXi 4.1 Hypervisor (VCL Guest Images on Workstations):

- **Hardware**: Apple Mac Pro; RAM: 32 GB; CPU: Intel
- **Max # of VCL Guest Images per machine**: 6
- **Projected Quantity of Mac Pro machines**: 10-20
- **Total Concurrent VCL Guest Images**: 60 - 120
- **Currently have 2 Mac Pro machines up**: 12 Nodes
- **Utilizes iRAPP (interactive Remote APPlication) Terminal Server application from Code Rebel**
- **Requires Microsoft RDP client to establish session**
CSU Fullerton – VCL Conceptual Diagram

Step 1: Students login to VCL Web Application

Step 2: VCL Manager reserves and loads guest images

Step 3: Users access guest images via Internet RDP / SSH

VMware ESXi 4.1 Hypervisor

NetApp Appliance

Load guest images

VMware ESXi 4.1 Hypervisor

VCL Manager

VCL DB

VCL Web

Students access CSUF VCL via Web Browser

Internet
Titan Cloud
The Cal State Fullerton Titan Cloud initiative encompasses several campus-wide projects undertaken by the Division of Information Technology to strategically take advantage of cloud computing technologies.

The two most prominent projects in the list are the Virtual Computing and the Server Virtualization Infrastructure projects.

Virtual Computing Infrastructure
CSU Fullerton’s Virtual Computing infrastructure allows you to reserve a computer with a desired set of applications for yourself, and remotely access it over the Internet. This service is powered by the Apache Software Foundation’s Virtual Computing Lab (VCL) software. As defined by the Apache Software Foundation, “The Virtual Computing Lab (VCL) is an open-source system used to dynamically provision and broker remote access to a dedicated compute environment for an end-user. The provisioned computers are typically housed in a data center and may be physical blade servers,
Welcome to the Virtual Computing Lab

Please select an authentication method to use:

- Local Account
- Remember my selection
- Proceed to Login

Explanation of authentication methods:
- Only use Local Account if there are no other options
- Shibboleth - testing only. Please ignore
- Use Fullerton LDAP if you are using an Fullerton Faculty/Staff
- Use Student Fullerton LDAP if you are using an Fullerton student

Copyright © 2004-2010 by Apache Software Foundation, All Rights Reserved.
Welcome to the Virtual Computing Lab

Hello Rommel Hidalgo

You do not have any current reservations. Please make a selection from the menu to continue.
https://vcl.fullerton.edu

- New Reservation

New Reservation

Please select the environment you want to use from the list:
ILC_Win7_SPSS19

Image Description:
Windows 7 with SPSS 19

When would you like to use the application?
- Now
- Later: Thursday at 9:30 a.m. (PST)

Duration: 1 hour
Estimated load time: < 1 minute

Create Reservation
https://vcl.fullerton.edu

- New Reservation – OS Options
https://vcl.fullerton.edu

- Creation of New Reservation

**Current Reservations**

You currently have the following normal reservations:

<table>
<thead>
<tr>
<th>Environment</th>
<th>Starting</th>
<th>Ending</th>
<th>Initially requested</th>
</tr>
</thead>
<tbody>
<tr>
<td>ILC_Win7_SPSS19</td>
<td>Friday, Nov 12th, 10:06 am</td>
<td>Friday, Nov 12th, 11:15 am</td>
<td>Friday, Nov 12th, 10:06 am</td>
</tr>
</tbody>
</table>

Pending...
Est: 1 min remaining

This page will automatically update every 20 seconds until the Pending... reservation is ready.
https://vcl.fullerton.edu

• New Reservation – Ready to Connect

Current Reservations

You currently have the following normal reservations:

<table>
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Click the **Connect** button to get further information about connecting to the reserved system. You must click the button from a web browser running on the same computer from which you will be connecting to the remote computer, otherwise, you may be denied access to the machine.
https://vcl.fullerton.edu

- New Reservation – User ID / Password

Connect!

You will need to use a Remote Desktop program to connect to the system. If you did not click on the Connect! button from the computer you will be using to access the VCL system, you will need to return to the Current Reservations page and click the Connect! button from a web browser running on the same computer from which you will be connecting to the VCL system. Otherwise, you may be denied access to the remote computer.

Use the following information when you are ready to connect:

- Remote Computer: 137.151.225.43
- User ID: rhidalgo
- Password: aNbkUw

NOTE: The given password is for this reservation only. You will be given a different password for any other reservations. For automatic connection, you can download an RDP file that can be opened by the Remote Desktop Connection program.

Get RDP File
https://vcl.fullerton.edu

- **New Reservation – User ID / Password**
- **CentOS 5.5**

Connect!

You will need to have an X server running on your local computer and use an ssh client to connect to the system. If you did not click on the **Connect** button from the computer you will be using to access the VCL system, you will need to return to the **Current Reservations** page and click the **Connect** button from a web browser running on the same computer from which you will be connecting to the VCL system. Otherwise, you may be denied access to the remote computer.

Use the following information when you are ready to connect:

- **Remote Computer**: 137.151.226.179
- **User ID**: rhidalgo
- **Password**: rBTEsA

**NOTE**: The given password is for **this reservation only**. You will be given a different password for any other reservations.

**NOTE**: You cannot use the Windows Remote Desktop Connection to connect to this computer. You must use an ssh client.
https://vcl.fullerton.edu

- New Reservation – VCL Session estab.
CSU Fullerton – ESRI ArcGIS 10 Demo
Questions?

http://titancloud.fullerton.edu

https://vcl.fullerton.edu