Get the VCL Codes for Installation

1. Log onto vcl.ncsu.edu and start a reservation using the image is "VCL Sandbox Base (CentOS 7)".

2. Open VCL webpage (vcl.ncsu.edu) and login with you NCSU credentials

3. Select VCL Sandbox CentOS 7 and create a reservation.

4. Select the duration for 20 weeks. This will be a long-term reservation so that you can log out and log back in and not lose your previous work

5. Use PuTTY (or equivalent) to login with your credentials at the IP provided

6. Change to admin role   (you are now in /root as superuser)
        sudo ssh mn

7. Pull from the VCL Apache mirror site
        wget http://apache.cs.utah.edu/vcl/2.5.1/apache-VCL-2.5.1.tar.bz2

8. untar the file
        tar -jxvf apache-VCL-2.5.1.tar.bz2

Install the Database

9. Install MariaDB Server
        yum install mariadb-server –y

10. Configure the database daemon to start automatically:
        /sbin/chkconfig --level 345 mariadb on

11. Start the database daemon:
        /sbin/service mariadb start

Create the Database

12. Create the VCL Database
        mysql

13. Create a database:
        CREATE DATABASE vcl;

14. Create a user with SELECT, INSERT, UPDATE, DELETE, and CREATE TEMPORARY TABLES privileges on the database you just created
(NOTE Use your own password in place of "vcluserpassword" and remember it for later installation parts):
GRANT SELECT,INSERT,UPDATE,DELETE,CREATE TEMPORARY TABLES ON vcl.* TO 'vcluser'@'localhost' IDENTIFIED BY 'vcluserpassword';

15. Exit the MySQL command-line client
exit

16. Import the vcl.sql file into the database. The vcl.sql file is included in the mysql directory within the Apache VCL source code
mysql vcl < apache-VCL-2.5.1/mysql/vcl.sql

Install and Configure Web Components

17. Install web components
yum install httpd mod_ssl php php-gd php-mysql php-xml php-xmlrpc php-ldap -y

18. Configure the web server daemon (httpd) to start automatically:
/sbin/chkconfig --level 345 httpd on

19. Start the web server daemon
/sbin/service httpd start

20. SELinux is enabled and must run the following command to allow the web server to connect to the database:
/usr/sbin/setsebool -P httpd_can_network_connect=1

Open appropriate ports so users can communicate with system

21. Open the iptables in sysconfig
vi /etc/sysconfig/iptables

22. Edit the iptables file by adding the following two lines
(make sure you add the rules *before* the following line
-A INPUT -j REJECT --reject-with icmp-host-prohibited

-A INPUT -m state --state NEW -p tcp --dport 80 -j ACCEPT
-A INPUT -m state --state NEW -p tcp --dport 443 -j ACCEPT

23. Restart iptables
service iptables restart

Install the VCL Frontend Web Code

24. Copy the web directory to a location under the web root of your web server and navigate to the destination .ht-inc subdirectory:
    ```
    cp -r apache-VCL-2.5.1/web/ /var/www/html/vcl-2.5.1
    ln -s /var/www/html/vcl-2.5.1 /var/www/html/vcl
    cd /var/www/html/vcl/.ht-inc
    ```

25. Copy secrets-default.php to secrets.php:
    ```
    cp secrets-default.php secrets.php
    ```

26. Edit the secrets.php file:

27. Set the following variables to match your database configuration:
    - $vclhost   (localhost)
    - $vcldb   (vcl)
    - $vclusername   (vcluser)
    - $vclpassword   (**PASSWORD YOU ENTERED WHEN DATABASE WAS CREATED**)

    Create random passwords for the following variables:
    - $cryptkey
    - $pemkey

28. Save the secrets.php file

29. Run the genkeys.sh
    ```
    ./genkeys.sh
    ```

30. Change directory
    ```
    cd /var/www/html/vcl
    ```

31. Edit the testsetup.php file
    Change the following line in the testsetup.php script from

    ```
    $myurl .= $_SERVER['HTTP_HOST'] . $_SERVER['REQUEST_URI'];
    ```

    to

    ```
    $myurl .= "127.0.0.1" . $_SERVER['REQUEST_URI'];
    ```

    Save the testsetup.php file

32. Change dir
    ```
    cd /var/www/html/vcl/.ht-inc
    ```

33. Copy conf-default.php to conf.php:
   cp conf-default.php conf.php

34. Modify conf.php to match your site

35. Review every entry under "Things in this section must be modified/reviewed". Descriptions and pointers for each value are included within conf.php. When finished, save the file.

36. Set the owner of the .ht-inc/maintenance directory to the web server user (normally 'apache'):
   chown apache maintenance
   chown apache cryptkey

37. Run the following command to allow the web server to write to maintenance and cryptkey
   chcon -t httpd_sys_rw_content_t maintenance
   chcon -t httpd_sys_rw_content_t cryptkey

38. Open the testsetup.php page in a web browser:
     https://**IP ADDRESS OF YOUR SANDBOX**/vcl/testsetup.php

NOTE:

- When the webpage comes up it will give a security warning and a suggestion to click on the button "Back to safety". Ignore that and click "Advanced"
- Next select the link at the bottom of the page " Proceed to YOUR IP ADDRESS (unsafe)"

What you should see on the screen is the following

+++

PHP version: 5.4.16

Including .ht-inc/conf.php ...
successfully included .ht-inc/conf.php

Checking COOKIEDOMAIN setting in .ht-inc/conf.php ...
COOKIEDOMAIN (152.46.17.140) appears to be set correctly

Checking that BASEURL in conf.php is set to use https ...
BASEURL correctly set to use https

Checking that SCRIPT is set appropriately ...
SCRIPT appears to be set correctly

Checking that other required constants are defined ...
All required constants are defined in .ht-inc/conf.php

Checking that .ht-inc/maintenance directory exists ...
.ht-inc/maintenance directory exists

Checking that .ht-inc/maintenance directory is writable ...
maintenance directory is writable

Checking that .ht-inc/cryptkey directory exists ...
.ht-inc/cryptkey directory exists

Checking that .ht-inc/cryptkey directory is writable ...
cryptkey directory is writable

Checking asymmetric encryption key for this web server ...
Asymmetric key validated

Testing for required php extensions ...
All required modules are installed

Checking values in .ht-inc/secrets.php ...
all required values in .ht-inc/secrets.php appear to be set

Testing mysql connection ...
Successfully connected to mysql on localhost
Successfully selected database (vcl) on localhost

Testing symmetric encryption ...
Successfully encrypted test string
Successfully decrypted test string

Testing asymmetric encryption key files ...
successfully created private key from private key file
successfully created public key from public key file

Testing asymmetric encryption ...
successfully encrypted test string
successfully decrypted test string

Testing for existance of dojo directory ...
dojo directory exists
dojo directory is readable

Testing for existance of spyc 0.5.1 and Spyc.php ...
spyc directory exists
spyc directory is readable
.ht-inc/spyc-0.5.1/Spyc.php file exists
.ht-inc/spyc-0.5.1/Spyc.php is readable

Checking themes for dojo css ...
themes/default has had dojo css copied to it
themes/dropdownmenus has had dojo css copied to it

Checking value of PHP display_errors ...
display_errors: **disabled**
NOTE: Displaying errors in a production system is a security risk; however,
while getting VCL up and running, having them displayed makes debugging
a little easier. Edit your php.ini file to modify this setting.
Done

++

- If all diagnostic results show green then you can close the web page and proceed to the next step.

39. Debug any issues reported by testsetup.php

Log into VCL Website

40. Open web page (https://**IP ADDRESS OF YOUR SANDBOX**/vcl/index.php)
    NOTE: Ignore the security message and click "advance"
    Select Local Account
    Username: admin
    Password: adminVc1passw0rd

41. (**DO NOT skip this step**) Under the "**MANAGE" tab** select user preferences. Set the admin user password: (**NOTE** – remember this password – you will need it to login to the VCL Web interface)
    Under the "Manage" Tab
    a) Click User Preferences
    b) Go to Change Password
    c) Enter the current password: adminVc1passw0rd
    d) Enter a new password
    e) Click Submit Changes

Add a Management Node to the Database

42. Under the "**MANAGE" tab** select the Management Nodes link

43. Click -- Edit Management Node Profiles and click "Submit"

44. Click on the box "Add New Management Node" and fill in these required fields:
    Name - The name of the management node server. (localhost)
    IP address –(the public IP address of the management node)
    SysAdmin Email Address –(your NCSU e-mail address)
    End Node SSH Identity Key Files - (/etc/vcl/vcl.key)

45. Click Add Management Node NOTE: A dialog will pop up informing you to add the management node to a group

46. read it and click Close

47. select the allManagementNodes group on the right
    click <-Add
    click Close

Install & Configure the Management Node

48. Change directory
        cd /root

49. Copy management node directory to working location
        cp -r apache-VCL-2.5.1/managementnode /usr/local/vcl-2.5.1
        ln -s /usr/local/vcl-2.5.1 /usr/local/vcl

50. Install Linux packages and Perl modules (run install_perl_libs.pl)
        perl /usr/local/vcl/bin/install_perl_libs.pl

    NOTE: If all installs were successful the following message will be printed
    COMPLETE: installed all components

51. Create the /etc/vcl directory:
        mkdir /etc/vcl

52. Copy the stock vcld.conf file to /etc/vcl:
        cp /usr/local/vcl/etc/vcl/vcld.conf /etc/vcl

53. Edit /etc/vcl/vcld.conf:
        vi /etc/vcl/vcld.conf

    The following lines must be configured in order to start the VCL daemon (vcld) and allow it to check in to the database:
    a) FQDN - the fully qualified name of the management node, this should match the name that was configured for the management node in the database
            localhost
    b) server - the IP address or FQDN of the database server
            localhost
    c) LockerWrtUser - database user account with write privileges
            vcluser
    d) wrtPass - database user password
            USE Password from step 14 -- REMEMBER IT
    e) xmlrpc_pass - password for xmlrpc api from vcld to the web interface(can be long). This will be used later to sync the database vclsystem user account
            RECORD PASSWORD
    f) xmlrpc_url - URL for xmlrpc api
            https://localhost/vcl/index.php?mode=xmlrpccall

54. save the vcld.conf file

Configure the SSH Client

55. Edit the ssh_config file:
    vi /etc/ssh/ssh_config

    Set the following parameters (add if they are not present):
    UserKnownHostsFile /dev/null
    StrictHostKeyChecking no

56. Save the ssh_config file

Install and Start the VCL Daemon (vcld) Service

57. Copy the vcld service script to /etc/init.d and name it vcld:
    cp /usr/local/vcl/bin/S99vcld.linux /etc/init.d/vcld

58. Add the vcld service using chkconfig:
    /sbin/chkconfig   --add vcld

59. Configure the vcld service to automatically run at runtime levels 3-5:
    /sbin/chkconfig --level 345 vcld on

60. Start the vcld service:
    /sbin/service vcld start

61. Check the vcld service by monitoring the vcld.log file:
    tail -f /var/log/vcld.log

    NOTE: Inspect the log file: verify that every few seconds the management node is checking in
    with the database:
    Example output to vcld.log
    2015-01-28 13:23:45|25494|vcld:main(167)|lastcheckin time updated for management node 1:
    2015-01-28 13:23:45

Set the vclsystem account password for xmlrpc api

    Access the vcld setup tool
62. Change directory to
    /usr/local/vcl/bin/

63. Type command   ./vcld -setup

64. Select 5. (Set Local VCL User Account Password)   and then Select 2. vclsystem

65. When prompted paste or type the password from xmlrpc_pass variable in the vcld.conf file and hit enter.

66. After setting the password for the vclsystem user, test that RPC-XML Access works correctly by selecting Item 2 (Test RPC-XML Access)

67. Type 'c' to cancel

Add Computers

68. Go to the VCL webpage

69. Click on
    a. Manage (drop down)
    b. Manage Computers, then
    c. Edit Computer Profiles, and then
    d. Add New Computer

70. Populate the table with the following entries
    Name: vmhost1
    Public IP Address: (anything)
    Private IP Address: 192.168.100.10
    Type: Bare Metal
    Provisioning Engine: None
    State: vmhostinuse
    VM Host Profile: KVM -local storage
    RAM: 8192
    No. Cores: 4
    Processor Speed   1000
    Use as NAT Host: checked
    NAT Public IP Address: (same IP as URL of website)
    NAT Internal IP Address: 192.168.200.10

71. Click Add Computer – read the Computer Grouping notice and hit close

72. Add 4 additional computers and populate the table with the following entries

       Add   Multiple computers
       Name   ARBITRARY NAME% (select a name and then add % sign)
       Start   Pick starting number
       End   pick ending number so that there are a total of 4 computers
       Starting Public IP Address   can be anything
       Ending Public IP address   pick ending number so that there are a total of 4 computers
       Type   Virtual Machine
       other addresses
              (if using Add Multiple, the beginning MAC address is
              the only MAC address that will need to be entered):
      For the starting MAC address enter the first MAC address
           52:54:00:ae:cf:00
       For the starting Private IP address enter 192.168.100.101
       For the ending Private IP address enter 192.168.100.104
       The private and public MAC addresses will populate automatically

private MAC,	public MAC,	private IP
52:54:00:ae:cf:00,	52:54:00:ae:cf:01,	192.168.100.101
52:54:00:ae:cf:02,	52:54:00:ae:cf:03,	192.168.100.102
52:54:00:ae:cf:04,	52:54:00:ae:cf:05,	192.168.100.103
52:54:00:ae:cf:06	52:54:00:ae:cf:07,	192.168.100.104

       Provisioning engine: Libvirt Virtualization API
       RAM: 2048
       No. Cores: 1
       Processor Speed   1000
       Connect Using NAT: checked
       NAT Host: vmhost1

73. Go to Manage Tab -> Manage Computers -> Edit Grouping -> Submit

74. Select Group by Computer. For **each** of the 4 VMs created in Step 73 associate each VM with all groups. **Do not** make any changes on vmhost1

75. Go to Manage Tab -> Select Virtual Hosts -> VM Hosts –

76. Select Configure Hosts -> Assign the 4 VMs that were created in Step 73 to vmhost1

77. import image
        mysql vcl < /root/add_sandbox_image.sql

78. Go to Manage Tab -> Go to Manage Images, Edit Grouping and Mapping and associate all image groups to the CentOS7 Base

Configure Virtual Hosts

79. Go to Manage Tab -> Click on Virtual Hosts   -- VM Host Profile – configure profile and make sure "configure KVM - local storage" is selected. Make the following edits

Virtual Disk Path: /pools/images
VM Working Directory Path: /pools/vms
VM Network 0:   private
VM Network 1:   nat

Associate Management Node with Groups

80. Go to Manage Tab -> Click on Management Nodes -> Select Edit Grouping & Mapping Associate all groups with Management Node

81. Go to Reservations Tab
    - Select New Reservation
    - Accept all default settings and click "Create Reservation"
    - Click on "Pending" – you should see the step-by-step progression as the virtual machine is loaded on your VCL Sandbox in a box labelled Detailed Reservation Status
    - When the Pending show "Ready to Connect" in green close the Detailed Reservation Status box

82. After you have established this original connection, make 3 more New Reservations in sequence – but do not connect to each virtual machine

83. You should now have 4 active reservations showing on your VCL sandbox webpage

84. Use PuTTY (https://www.putty.org/) or another equivalent ssh communications software client pick one of the 4 active reservations and click the Connect button to complete the connection and login to the VCL sandbox VM.

85. Click on "Connect" and obtain the
    a. Remote Computer Address
    b. Remote Computer port
    c. User ID
    d. Password

86. Logout of this sandbox

87. After you have successfully logged into the VCL sandbox VM, then logout.

88. Delete all 4 VCL Reservations

89. Log out of the Virtual Computing Lab Sandbox

90. CONGRATUALTIONS! - You have installed and configured the VCL Sandbox and you are ready to begin labs and homework with this cloud system.