

2022 CAE in Cybersecurity Community Symposium

University of San Diego Cyber Cloud Project (CCP)

CAE class of 2022

Contact Information

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Why develop a Capstone Project?

- First and foremost, we have found local small and medium size businesses are reluctant to allowing student in their systems.
- The ability to develop and assess competencies is vital to a strong Cyber Work Force.
- Development of competencies is accomplished throughout the program with hands-on labs
- The Capstone is where the student can full demonstrate their skills.
- The deliverables from the Capstone provide great assessment for the student and a portfolio of their work.

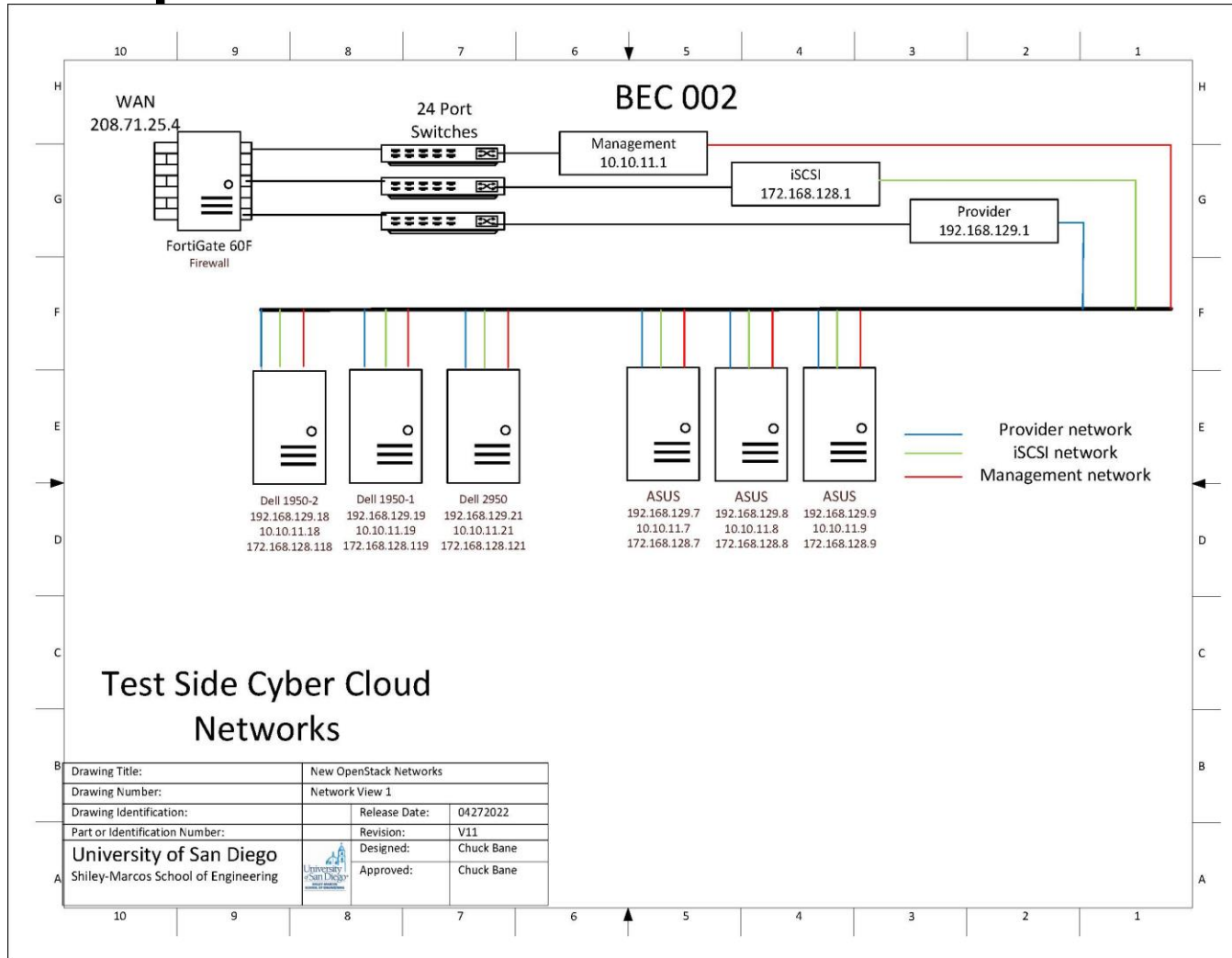
Why OpenStack Private Cloud?

- For the Capstone we wanted a flexible, rapid reconfigurable environment
- The cost for cloud development and maintenance for a 24/7 365 environment was very high for both commercial cloud and training ranges.
- First and foremost, we have found local small and medium size businesses are reluctant to allowing student in their systems.
- A review of local virtual environments brought us to an open source solution -- OpenStack.

OpenStack Implementation

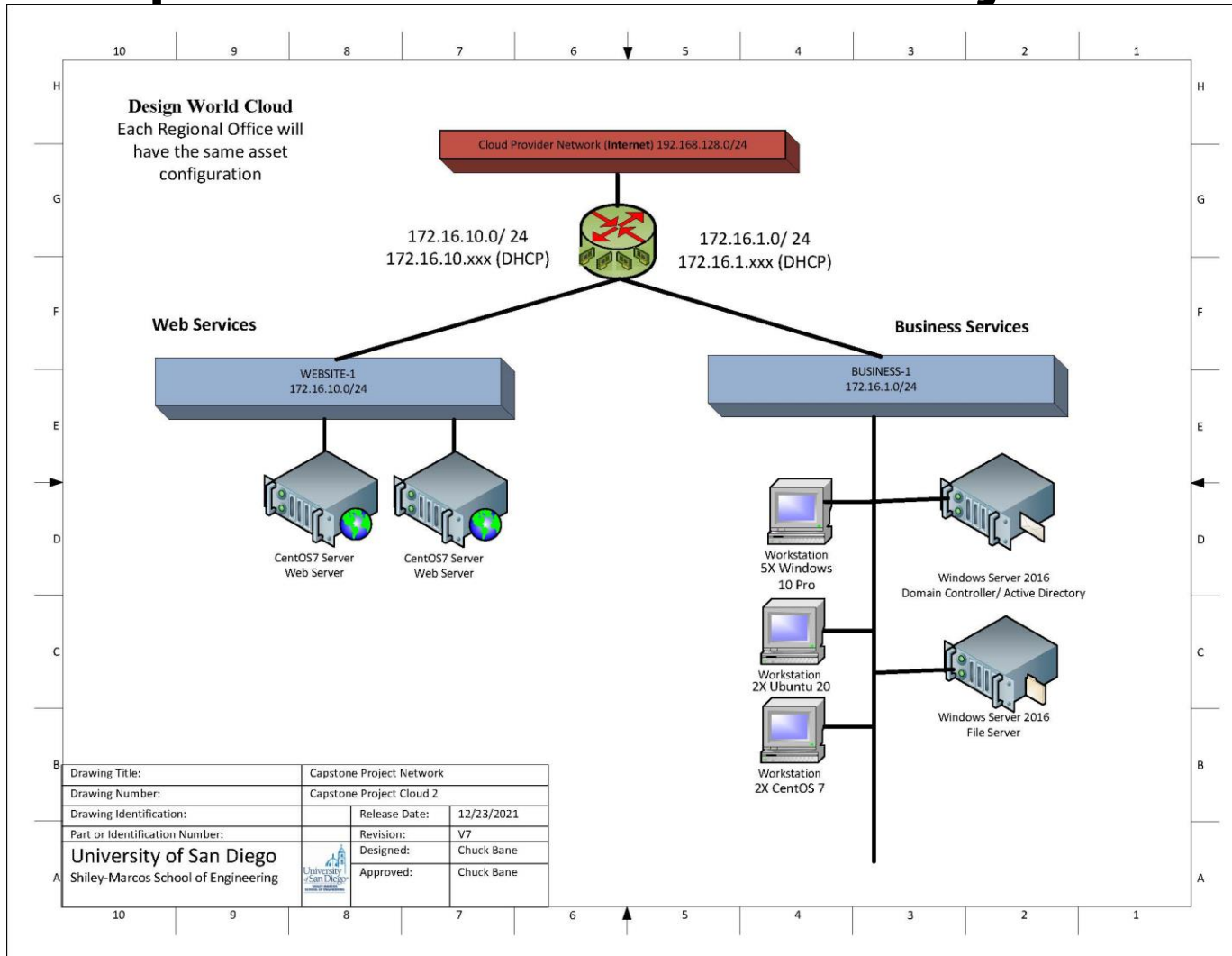
- A Grant from CISCO was our kick off and supported by our Advisory Board and Alumni equipment donations the USD Cyber Cloud was started.
- There are two major steps in building the environment
 - Infrastructure
 - Cloud Projects

OpenStack Infrastructure



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OpenStack Cloud Projects



OpenStack Automation With Ansible

- The installation and setup of the first project took weeks to complete
- With Ansible time to setup was reduced to minutes for projects and hours for infrastructure rebuilds.
- There playbooks for both infrastructure and classroom projects.

OpenStack Automation With Ansible -- Playbook

```
*D:\Downloads\Controller\CapStone-SU22-classroom-OLV2.yaml - Notepad++
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
admin.sh x Generate_Local_Users-pwV2.bat x 2021-12-22_1341_Create_Local_Users.txt x new 2 x bulk_users1.ps1 x CapStone-SU22-classroom-OLV2.yaml x
11 #make classroom FILE=./
12 #""
13 #
14 Version: 1.1
15 Domain:
16   Name: online
17 Project:
18   Name: Design-World-SU22-OL-2
19 Networks:
20   - Name: BUSINESS-102
21     Provider: Cloud-Provider
22     External: True
23     Subnet: 172.16.102.0/24
24   - Name: WEBSITE-120
25     Provider: Cloud-Provider
26     External: True
27     Subnet: 172.16.120.0/24
28 Students:
29   - Bane,Chuck,cbane3
30
31 Machines:
32   PerProject:
33     - CentOS,2,CentOS 7 GUI 12-24-20,m4.large,BUSINESS-102,class-project
34     - Ubuntu 20,2,Ubuntu 2 GUI 12-24-20,m4.large,BUSINESS-102,class-project2
35     - CentOS Server,2,SD-Web-1-12-31,m16.large,WEBSITE-120,class-project
36     - Windows 10 Pro,5,Windows 10,m4.huge,BUSINESS-102,win1
37     - Windows server 2016,2,DW-SP22-OC-1-DC,m16.huge,BUSINESS-102,win
38     # - SecurityOnion2,1,SecurityOnion2,m16.huge,BUSINESS-102,nova
39   PerUser:
40     - UserKali,1,Kali-2021-1_4-22-22,m4.large,BUSINESS-102,kali
41
42
YAML Ain't Markup Language length: 1,089 lines: 42 Ln: 30 Col: 1 Pos: 577 Unix (LF) UTF-8 INS
```

Summary

- PRO -- Capstone Projects give true hands on experience
- PRO -- Capstone Project provide a great way of assessing Student competences
- PRO – OpenStack (Open Source) is a low cost alternative to commercial cloud and professional ranges.
- PRO – OpenStack will run on almost any server (our oldest Dell 1950 and Asus servers (2005)
- CON – OpenStack has a steep learning curve.