

## University of San Diego Assessing Cyber Competencies with Capstone Projects

## Contact Information

Chuck Bane ([cbane@sandiego.edu](mailto:cbane@sandiego.edu))

Academic Director MS Cybersecurity Engineering

Shiley-Marcos School of Engineering

University of San Diego

5998 Alcalá Park

San Diego CA 92110

(619) 260-7771

## Why Focus on Developing competencies

- Competencies are the set of behaviors and attributes that an employee needs to be successful in a given role. In an organization, competencies are often used to describe the skills, knowledge and traits that are required for success in a particular job or position.
- Industry identified the need for Cyber graduates to start contributing without long company training.
- Institutions of higher education need to teach more than theory

# 2023 CAE in Cybersecurity Community Symposium

## Types of Competencies

- Technical competencies
- Behavioral competencies
- Functional Competencies

## What are the benefits of competency development?

- Better performance and productivity
- Improved career progression
- Increase in engagement and retention
- Favorable hiring decisions and lower recruitment costs
- Enhanced organizational effectiveness

## How to Develop Curriculum to Teach Competencies

- Develop Learning Objectives (LO) that require hands-on elements
- Develop hands-on elements (Labs) in all classes
- Tie LO and Labs to Competencies
- Assess Competencies

## Why develop a Capstone Project?

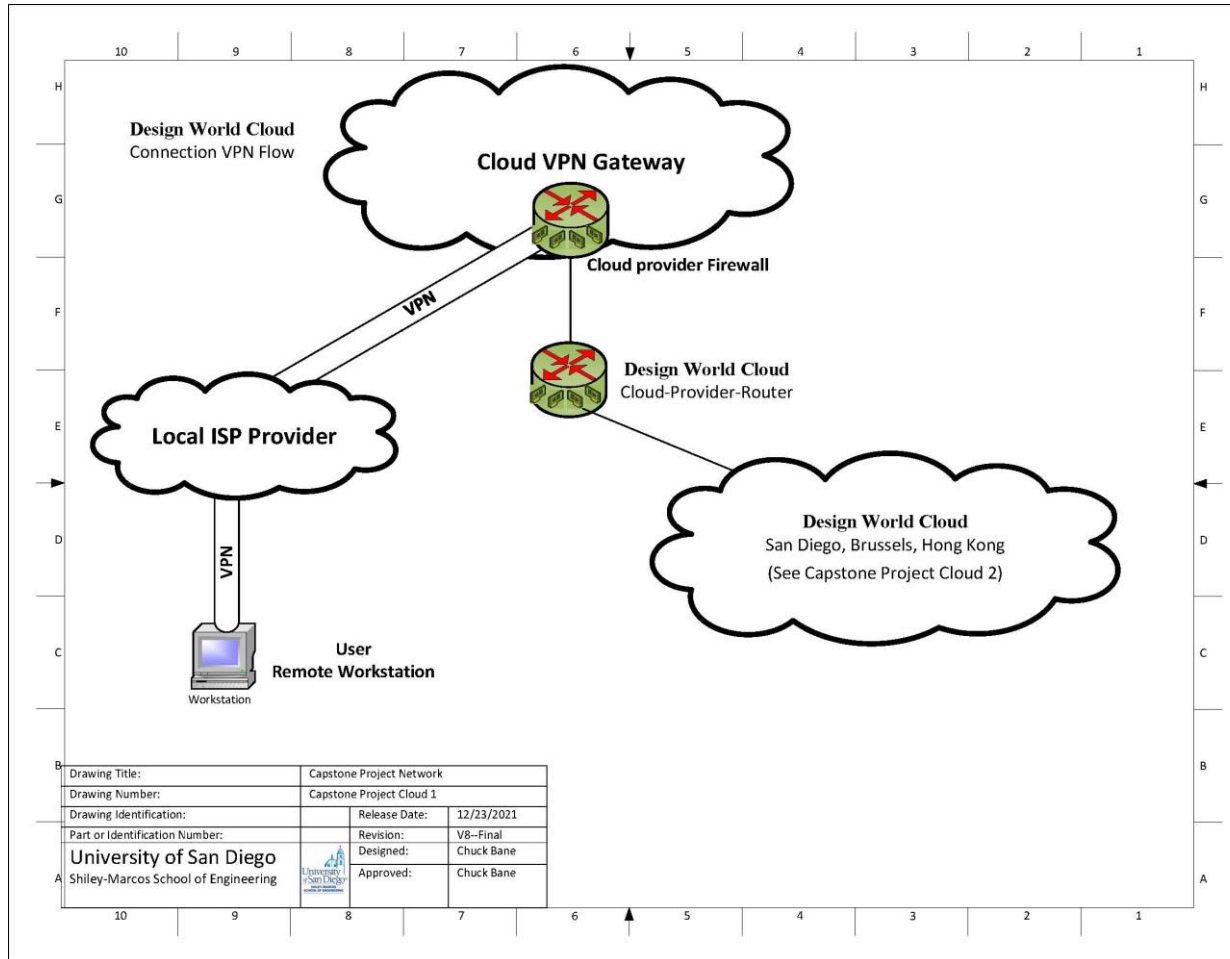
- First and foremost, we need a way to teach and assess Cyber Competencies on all levels.
- We have found local small and medium size businesses are reluctant to allowing student in their systems.
- The ability to develop and assess competencies is vital to a strong Cyber Work Force.
- Development of 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?

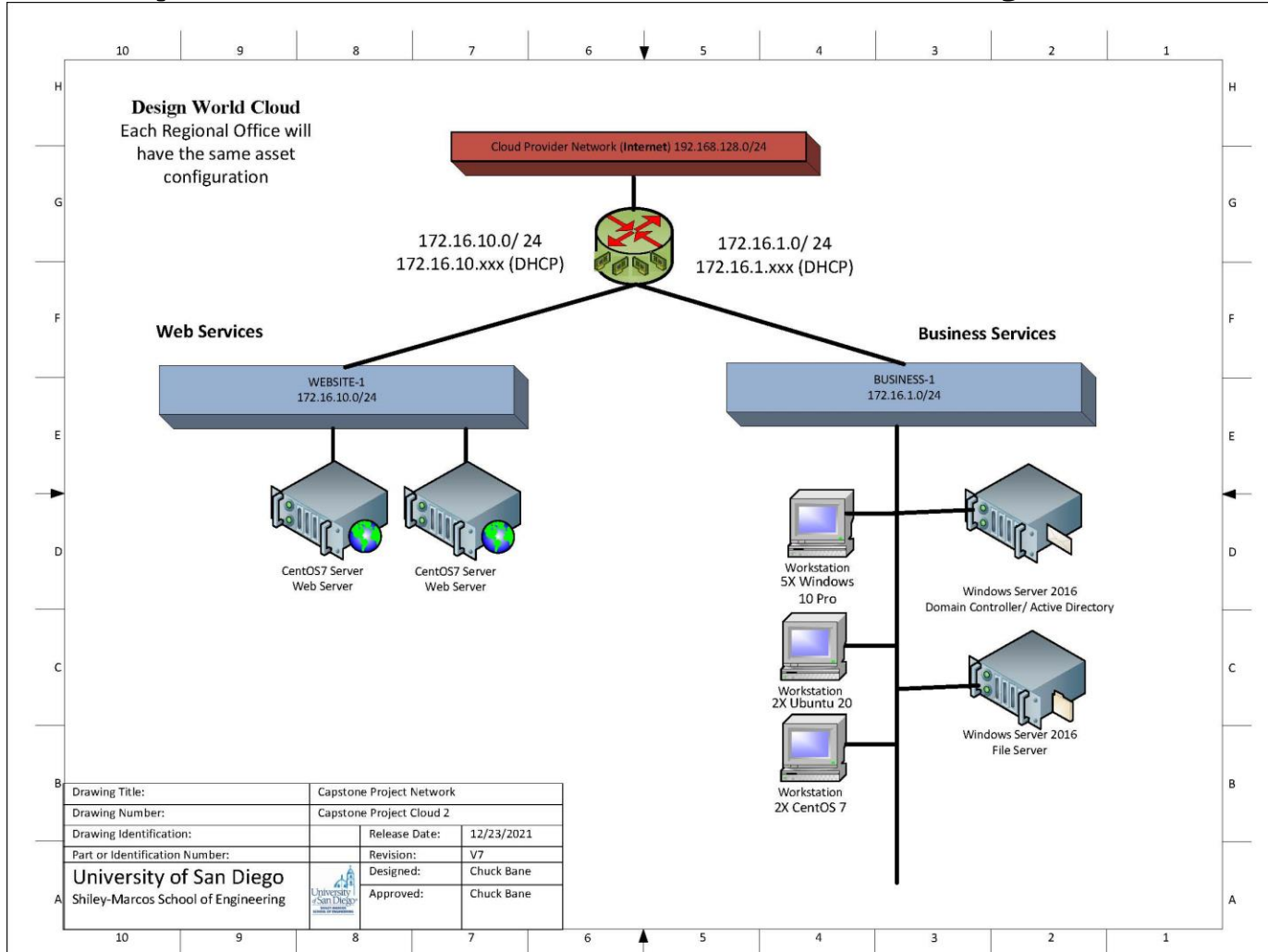
- For the Capstone we wanted a flexible, rapid reconfigurable environment
- The cost for cloud development and maintenance for a 24/7 365 environment was very high for both commercial cloud and training ranges.
- A review of local virtual environments brought us to an open source solution -- OpenStack.



## VPN Infrastructure



## OpenStack Cloud Projects



# 2023 CAE in Cybersecurity Community Symposium

## Summary

- Ensure hands-On elements
- Development of competencies is accomplished throughout the program with hands-on labs
- The Capstone is where the student can fully demonstrate their skills.