

# Evidencing Competencies Through Cyber Competitions

Jake Mihevc - NCAE Cyber Games Competition PI  
Dan Manson- CAE Evidencing Competencies Workgroup  
Sean Radigan - NCAE Cyber Games Technical Director

Contact us here!



**NCAE  
CYBERGAMES**  
PLAY | LEARN | PROTECT

# Pilot framework ideas:



- 1) Leverage Evidencing Competencies Work Group ABCDE model
- 2) Reference/align with workforce frameworks such as DCWF and NICE FW
- 3) Consider alignment with CAE KU Outcomes
- 4) Work towards competencies “in a contested environment”
- 5) Address proficiency levels
- 6) Provide a clear summary of what tasks the participant performed to earn the badge
- 7) Align with findings from Evidencing Competencies Work Group research led by Dan Manson on student understandings of competencies

# Kanban: Enabling tasking and assignment

Assigned to me

### Not Started

Get SSH Online

Bring the SSH Server online

[Assign Self](#)  
[Assign Task...](#)

### In Progress

[CTF] challenge\_2

Complete the CTF challenge challenge\_2

---

This is a multi-line description.

Here is the second paragraph.

And the third, with formatting, `code blocks`, and more formatting!

```
def full_on_code_block():  
    pass
```

Assigned To: [Assign Self](#)  
`user9@tapi.edu` [Assign Task...](#)

[CTF] challenge\_1

### Completed

Get DNSOnline

Bring the DNS Server online + configure `external` dns

Assigned To: [Assign Task...](#)  
`user1@tapi.edu`



# Red Team Dashboard: Tracking remediation status

	Team0	Team1	Team2	Team3	Team4	Team5	Team6	Team7	Team8	Team9	Team10	Team11	Team12
SSH router redteam	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
SSH router root_malicious_key	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
SSH router default_root	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
SSH shell redteam	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
SSH shell mal_users	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚
SSH shell ansible	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
SSH shell root_malicious_key	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
SSH shell default_root	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
SSH shell nobody	↑	↑	↑	↓	↑	↑	↑	↑	↑	↑	↑	↑	↑
SSH www redteam	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
SSH www mal_users	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚
SSH www www-data	↓	↓	↓	↓	↓	↓	↓	↑	↓	↓	↓	↓	↓
SSH www ansible	↓	↓	↓	↓	↓	↓	↓	↑	↓	↓	↓	↓	↓
SSH www root_malicious_key	↓	↓	↓	↓	↓	↓	↓	↑	↓	↓	↓	↓	↓
SSH www default_root	↓	↓	↓	↓	↓	↓	↓	↑	↓	↓	↓	↓	↓
SSH www nobody	↓	↓	↓	↓	↓	↓	↓	↑	↓	↓	↓	↓	↓
SSH db redteam	↓	↓	↓	↓	↓	↓	↓	↑	↓	↓	↓	↓	↓
SSH db mal_users	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚
SSH db ansible	↓	↓	↓	↓	↓	↓	↓	↑	↓	↓	↓	↓	↓
SSH db root_malicious_key	↓	↓	↓	↓	↓	↓	↓	↑	↓	↓	↓	↓	↓
SSH db default_root	↓	↓	↓	↓	↓	↓	↓	↑	↓	↓	↓	↓	↓
SSH db nobody	↓	↓	↓	↓	↓	↓	↓	↑	↓	↓	↓	↓	↓
SSH dns redteam	↓	↓	↓	↓	↓	↓	↓	↑	↓	↓	↓	↓	↓
SSH dns mal_users	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚
SSH dns ansible	↓	↓	↓	↓	↓	↓	↓	↑	↓	↓	↓	↓	↓
SSH dns root_malicious_key	↓	↓	↓	↓	↓	↓	↓	↑	↓	↓	↓	↓	↓
SSH dns default_root	↓	↓	↓	↓	↓	↓	↓	↑	↓	↓	↓	↓	↓
SSH dns nobody	↓	↓	↓	↓	↓	↓	↓	↑	↓	↓	↓	↓	↓
Redis RCE Shell	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚
Redis RCE DNS	↓	↓	↓	↓	↓	↓	↓	↑	↓	↓	↓	↓	↓
Redis RCE WWW	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚
Redis RCE MySQL	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚	⌚
Webmin DNS	↓	↓	↓	↓	↓	↓	↓	↑	↓	↓	↓	↓	↓
Webmin MySQL	↓	↓	↓	↓	↓	↓	↓	↑	↓	↓	↓	↓	↓

NCAE Cyber Games  
Technical Data  
Sources

Sandbox

Red Team

CTF

Competency  
Statements?

Align with  
existing  
frameworks:

CAE KU's  
NIST NICE  
DoD DCWF

Badging?

Student journey and narrative from contested environment in a competition to the Workforce.



NCAE  
**CYBERGAMES**

PLAY | LEARN | PROTECT

We are tying technical data to ABCDE  
Competency to Badging while aligning with  
existing frameworks.... how are we doing?!

What Competencies should we target for a pilot?

Contact us here!



- Configure internal and external DNS
- Maintain user access over SSH
- Use valid SSL certificate for web server
- Web server running critical application stays online
- MySQL connection stays online
- Route traffic to internal hosts from an external endpoint
- Maintain FTP online and files available
- Detect and remove unauthorized system access
- Detect and remove anomalous/malicious files

What Competencies should we target for a pilot?

Contact us here!



Dan Manson:  
ECWG  
Competitions  
Workgroup  
Lead

## The Essential Elements of Competency

Competency is most effectively described using 5 key elements:

**A - actor** (who exhibits the competency);

**B - behavior** (what task the actor is expected to complete);

**C - context** (how the behavior is enacted);

**D - degree** (how much time, accuracy and degree of completion);

**E - employability** (what professional skills are necessary for this task to be enacted in a way that would be appropriate for the workplace).

Dan Manson:  
ECWG  
Competitions  
Workgroup  
Lead

## A - Actor

- Identify level of participant (e.g. high schooler, freshman, junior etc.)
  - State any previous courses and/or knowledge they should have acquired before attempting this competency
  - Summarize assumed level of knowledge
  - Infers anticipated level of proficiency
-



Dan Manson:  
ECWG  
Competitions  
Workgroup  
Lead

## B - Behavior

- Corresponds with work role and task listed in existing frameworks (e.g. NICE framework or DoD DCWF)
- Identifies work role and specific task (s)
- Note: identifying the task and work role builds a direct connection between the educational activity and the workplace.

Dan Manson:  
ECWG  
Competitions  
Workgroup  
Lead

## C - Context

- Describes the unique scenario in which the behavior is enacted
- Describes the tech, documentation and any limitations placed on the student
- Provides the "story" of how the competency was enacted (employers particularly value this in interview conversations)

Dan Manson:  
ECWG  
Competitions  
Workgroup  
Lead

## D - Degree

- Identifies how much time might be assumed for competent engagement with task, how much accuracy is required and how much of the task needs to be completed
- Shifts focus from academic (potential 100% by each individual) to 'would this be good enough for an employer?'

Dan Manson:  
ECWG  
Competitions  
Workgroup  
Lead

## E - Employability

- A person can be technically able but remain unemployable unless they also have the professional skills required by a specific workplace.
- Professional skills tend to include teamwork, critical thinking, communication, integrity, and ethical judgement and reasoning (<https://www.montreat.edu/student-life/montreat-360/>).
- These cannot be tacitly assumed, but need to be identified and stated.



# Talk to us today about:

- Classroom/club integration guides
- Competition on-demand
- Competition-in-a-box
- Infrastructure Backend
- Competencies in Competitions
- Tracking and Badging
- Whatever!



**NCAE**  
**CYBERGAMES**

PLAY | LEARN | PROTECT