# Community Cybersecurity Preparedness Simulation Everyone has a role

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# **Course Development**



This course was developed by
The Center for Infrastructure Assurance and Security
At The University of Texas at San Antonio

The CIAS has been working with communities to improve their cybersecurity posture since 2002.

Core competencies include cybersecurity training, exercises, competitions, game development, culture of security initiatives, information sharing and cybersecurity community programs.



# **Consortium Members**

- National Cybersecurity Preparedness
   Consortium Members
  - Cyber Defense Initiative-CJI/UA System
  - Center for Infrastructure Assurance and Security-University of Texas-San Antonio
  - Texas A&M Engineering Extension
     Service-Texas A&M University System
  - Center for Information Assurance, Univ.
     Memphis
  - Norwich University Applied Research Institutes, Norwich University

# **National Cybersecurity Preparedness Consortium**



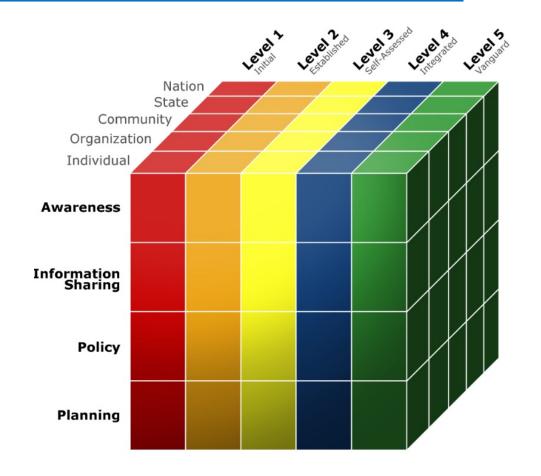




# **Organized Around the CCSMM**

The Community Cyber Security Maturity Model:

- Framework for cybersecurity preparedness
  - Focusing first on low and no cost solutions
- Everyone has a role in cybersecurity from the individual, organization, community, state and nation
- Addresses all aspects of cybersecurity
- Incorporates other frameworks such as the NIST CSF, NICE, CMMC, EMP and others
- Provides a roadmap to improve cybersecurity posture





# MGT-301 Community Cybersecurity Preparedness Simulation

- This one-day course is designed to simulate a community-wide cyber security event.
- Using a gamification approach, participants will strategize with a diverse group of stakeholders to plan for and respond from a cybersecurity incident that could have cascading effects across a community.







# **Objectives**

- Discuss organizational and community cybersecurity preparedness
- Explain how budgeting and planning considerations with limited resources play a role in a cybersecurity program
- Discuss possible cascading effects a cyber-attack may have on a community
- Identify strategies to prevent, detect, mitigate, respond to, and recover from a cyber incident





# **Cyber-attacks on Communities**

- Atlanta, Ga.
- Baltimore, Md.
- St. Lucie, Fla.
- New Bedford, Mass.
- New Orleans, La.
- Greenville, N.C.
- Pensacola, Fla.
- Wilmer, Texas
- And more...







# **Cyber-attacks in Ohio**

- Riverside (May 2018)
  - Police and Fire Departments 2 attacks within weeks. Deleted 10 months of information
- Lakeland Community College (Sep 2023)
- City of Circleville (Sept 2023)
- Huber Heights (Nov 2023)
  - Compromised PII 6,000 people. Affected the city's zoning, engineering, tax, fiancé, utilities, human resources, and economic development divisions.
- Healthcare (Feb 2024)
  - Change Healthcare unable to process claims

Arlington Health – unable to submit patient bills





# **Community Vulnerability Landscape**

The convergence of physical and information technologies used by communities create new opportunities for cyber-attacks. Some key technologies and systems:

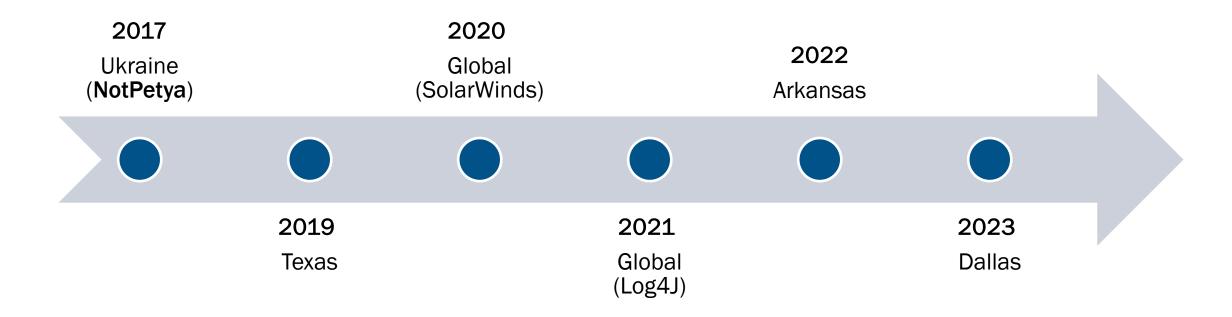
- Traffic Control Systems
- Smart Street Lighting
- Regional Utility Management Systems (electric, waste, water)
- Sensors
- Public Data
- Mobile Applications

- Cloud and SaaS Solutions
- Smart Grid
- Public Transportation
- Cameras
- Social Media
- Location-based Services





# **Cascading and Widespread Impacts Over Time**







# **Adversary Motives (Why)**















Financial

War or Defense

Social or Political

Facilitation

Nuisance or Destruction

Ego

Espionage





# **Ohio County Treasurers Role**

# **Ohio County Treasurers Responsibilities**

- Tax collection: Collecting local taxes
- Tax safekeeping: Safeguarding taxes for schools, cities, townships, and villages
- Financial statement preparation
- Fund investment
- Cash management: County's cash manager and leader in fiscal management and accountability
- Delinquent tax collection
- Property tax escrow account
- Unclaimed funds







# Mission Essential Functions (Critical Business Services)

# **Mission Essential Functions**

Mission Essential Functions (MEFs) are a limited set of functions that must be continued throughout or resumed rapidly following the disruption of normal operations. Enable organizations to provide vital services, such as:

- Exercise civil authority
- Maintain public health & safety
- Sustain critical economic activities
- Uphold the rule of law







# Organizational MEFs vs Community Resilience

How would the community be impacted if Mission Essential Services were compromised?

- City Government
- City Utilities
- Community Bank
- Community Hospital
- K-12 School District
- Private Sector Business



City Government must continue the policies and programs of city administration in order that it can continue to serve the residents of the city such as municipal courts, tax collection, and business regulation.

# MEF 2 Municipal Courts

Govern

Organizational Priorities

pryings are determined and

**IDENTIFY** 

Asset & Data

Management

software, services, and sensitive data

are inventoried and prioritized bas

on organizational value.

Municipal Courts must continue operate and provide jurisdiction over criminal cases, issue warrants, conduct trials and collect payments.

# MEF 3 Public Transportation

City Government

DETECT

Logging & Alerts

ogged and correlated from multiple

ources. The organization's audit/lo

RESPOND

Incident Management

incidents against the organization are

managed. Processes & procedures an

xecuted and maintained to detect

**PROTECT** 

Access & Authentication

Management

and devices, Multi-Factor

Public Transportation must continue to serve the city population, providing for the movement of its citizens.

# MEF 4 Police and Fire Department

RECOVER

Continuity of Operations

Continuity of Operations Plan (COOP)

a disruptive event. It outlines steps to

ations continue during and after

ensuring essential functions and

Continue to maintain public order and safety, enforcing the law and preventing, detecting, and investigating criminal activities. Continue to maintain fire and rescue services, hazmat operations, and emergency management operations including 911 dispatch operations.

Including 911 dispatch operat





# **Treasurer Essential Functions**

How would the community be impacted if your Mission Essential Services were compromised?

- **Collect Tax Payments**
- Receive monies from county offices
- Distribute/Manage ACH's
- Balance daily work
- Monitor and Move Investments
- Tax Bill Prep and mail
- Month End Reports
- Tax Ease Certs



## City Government

### Govern

Organizational Priorities

services are determined and enunicated to relevant stakeho

# Risk Management

and agreed to by organizational

# Roles & Responsibilities

whorsocurity make are integrated int human resources practices, and esponsibilities are coordinated and aligned with all internal and externa stakeholders to enable accountabili performance assessment and

# Policy & Procedures

Organizational cybersecurity policy established and communicated to the organization.

### Inject Deck (Face Down)

### IDENTIFY

Asset & Data Management

software, services, and sensitive data are inventoried and prioritized bases on organizational value.

### Vulnerability Management

procedures for receiving, validating and responding to vulnerabilities are defined. Vulnerability scans are

### Information Sharing Collection

rom information sharing organization (ISAOs), forums, and other sources.

### Supply Chain Management

cybersecurity risks are identified. assessed, and managed consistent with the organization's priorities.

### Inject Deck (Face Up)

### **PROTECT**

Access & Authentication Management

Access to the organization's assets it limited to authorized users, processe and devices, Multi-Factor Authentication and the principles of least privilege are leveraged where risks of unauthorized access are high

# Awareness & Training

partners receive training on cybersecurity awareness, duties, and responsibilities according to policie rocedures, and agreements.

# Encryption

The confidentiality, integrity, and availability of the organization's d at rest, in use, and in transit are

# Backups

## Public Administration

policies and programs of city administration in order that it can continue to serve the residents of th city such as municipal courts, tax collection, and business regulation

### DETECT

ources. The organization's audit/log with established policy.

## **Network Monitoring**

The organization uses antiviru software to protect against cybersecurity malware threats

Backups of the organization's data a conducted, maintained, and tested.

# MEF 1

RESPOND

Incident Management

incidents against the organization are

managed. Processes & procedures an

executed and maintained to detect

**Incident Analysis** 

vestigations of cybersecurity e

to ensure effective responses and

Incident Reporting &

poort recovery activities.

and respond to the incidents.

Logging & Alerts

logged and correlated from multiple

network services are monitored for adverse cybersecurity events.

### Virus Protection

Mobile Device

Management

ystems and policy.

MEF 2

Communication information sharing and escalation procedures with designated internal nd external stakeholdes (such as

### gencies) as required by law. equiation, or policy Incident Mitigation

Federal, State & law enforcement

activities and procedures to prevent the expansion of an event and nitigate its effects.

### MEF 3 Public Transportation

Public Transportation must continu to serve the city population. providing for the movement of

### RECOVER

Continuity of Operations

Continuity of Constitions Plan (COOP) ensuring essential functions and ations continue during and afte a disruptive event, it outlines steps to minimize downtime, maintain critica services, and recover promptly.

## System & Data Recovery

recovery and reconstitution of the Information system to a known state after a disruption compromise or

### **Public Relations**

recovery activities and progress in restoring operational capabilities with levant Internal and external

# Cyber Insurance

coverage to protect itself from financial losses and Itabilities due to cyber attacks or data breache

### MEF 4 Police and Fire Department

safety, enforcing the law and preventing, detecting, and investigating criminal activities. Continue to maintain fire and rescue services, hazmat operations, and including 911 dispatch operations.

# **Municipal Courts**

Municipal Courts must continue operate and provide jurisdiction over criminal cases, issue warrants, conduct trials and collect payments.

# Organizational Cybersecurity Budgeting & Planning

# **Cybersecurity Budgeting and Planning**

Leaders need to think about how much funding they will need, and how they will allocate their budgets to address cybersecurity threats their organizations may face.

# Key factors:

- Need to know what to protect.
- Need to have methods to detect and respond.
- Need to have a cyber-recovery plan in place.
- Need to educate and train your employees regularly.

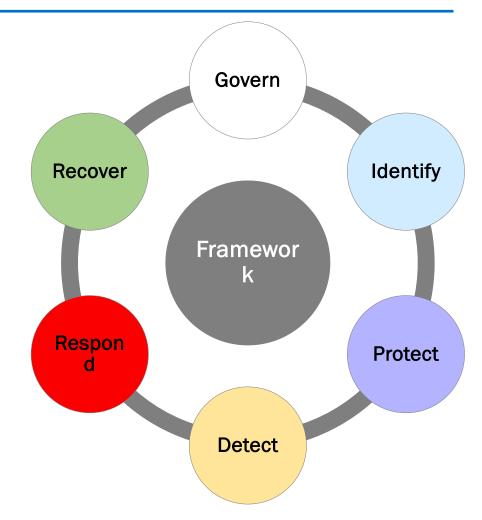




# **NIST Cybersecurity Framework (CSF)**

## The NIST CSF is:

- A living document based on international standards.
- A common and accessible language.
- Risk-based.
- Adopted internationally.
- Used in the Nationwide Cybersecurity Review.
- Leveraged by public and private entities.







# The Cybersecurity Planning Board

- The planning board is a matrix depicting an Organization's Cybersecurity Planning Framework:
  - categories are Govern, Identify, Protect,
     Detect, Respond and Recover.
- Each category of the Framework is divided into smaller subcategories, representing cybersecurity actions and controls.
- Displayed are the top four Mission Essential Functions (MEFs) for the organization.





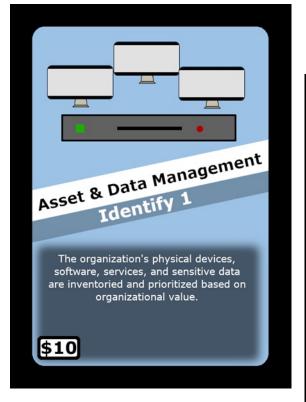


# The Organization's Planning Cards

Each planning group has 24 planning cards that correspond to the subcategories on the planning board.

Each planning card features a:

- Subcategory name
- Identifying number (e.g., Identify 1)
- Description of the actions or controls
- Budget cost





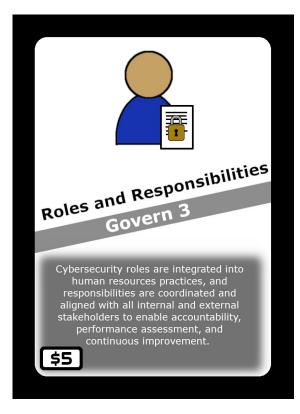


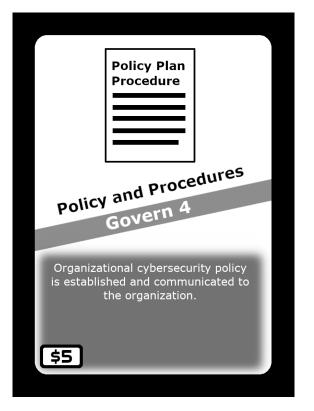


# **Planning Cards - Govern**













# **Planning Cards – Identify**









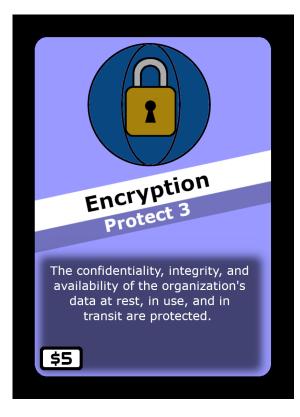




# **Planning Cards - Protect**





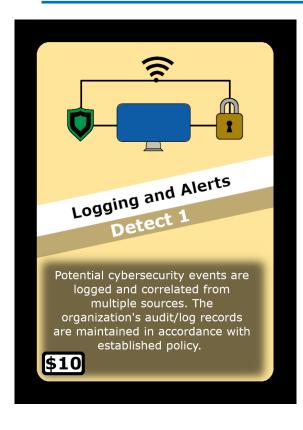








# **Planning Cards - Detect**









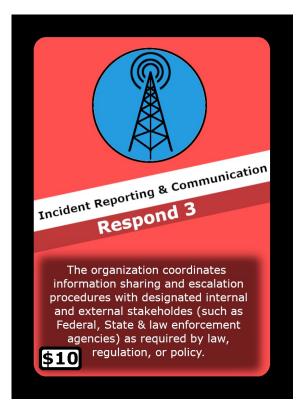




# **Planning Cards - Respond**





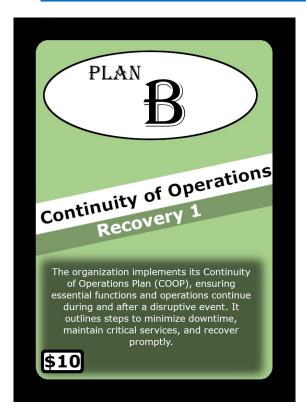


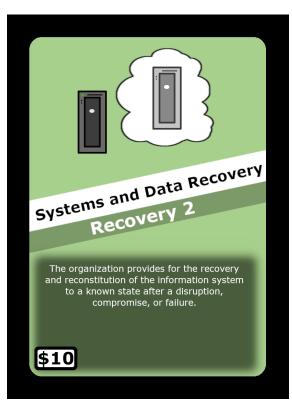


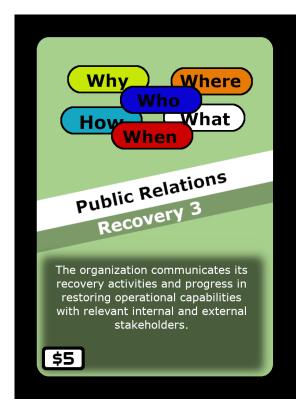


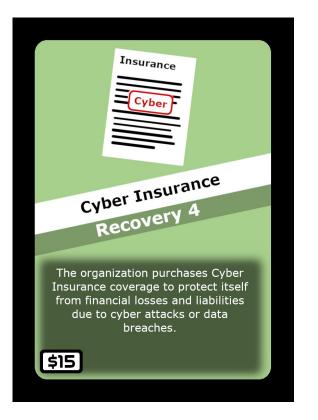


# **Planning Cards - Recover**













# The Organization's Planning Budget

# The Cyber Program Budget is \$100.

- Purchase Planning Cards
  - Represents implementation of the controls/activities
  - Uncovered areas are not being performed or implemented
- Record on Budget Planning Tracking Sheet

### **Budget Planning Tracking Sheet**

Planning Card Title	Cost	Purchasing Budget Used
		(\$100 allowed)
G1 Organizational Priorities	\$5	
G2 Risk Management	\$5	
G3 Roles & Responsibilities	\$5	
G4 Policy & Procedures	\$5	
I1 Asset & Data Management	\$10	
I2 Vulnerability Management	\$15	
13 Information Sharing - Collection	\$10	
I4 Supply Chain Management	\$10	
P1 Access & Authentication	\$10	
P2 Awareness & Training	\$5	
P3 Encryption	\$5	
P4 Backups	\$10	
D1 Logging & Alerts	\$10	
D2 Network Monitoring	\$10	
D3 Virus Protection	\$5	
D4 Mobile Device Management	\$5	
Rs1 Incident Management	\$15	
Rs2 Incident Analysis	\$10	
Rs3 Incident Reporting & Communication	\$10	
Rs4 Incident Mitigation	\$10	
Rc1 Continuity of Operations	\$10	
Rc2 System & Data Recovery	\$10	
Rc3 Public Relations	\$5	
Rc4 Cyber Insurance	\$15	

Costs are based on Talent, Technology, and Time considerations.





# **Activity – Organizational Planning (15 Min)**

- 1. In your group, review the planning cards.
- 2. Your organization has a budget of \$100 to spend on cybersecurity.
- 3. Discuss the activities you deem most important.
- 4. Select the planning cards your organization will purchase:
  - track purchases on the Budget
     Planning Tracking Sheet; and
  - stay within your budget.

- 5. Cover the activities you purchased on the Planning Board with the Planning Card.
- 6. Select a Reporter and Score Keeper.
- 7. Consider the following questions. Be prepared to share your observations:
  - Which 2-3 activities are most important and should be done first? Why?
  - If you had and extra \$5 to \$15, what would you have covered? Why?





# Activity - Report Out (10 Min)

Share your observations with the class:

- Which 2-3 activities are most important and should be done first? Why?
- If you had an extra \$5 to \$15, what would you have covered? Why?







# **Cybersecurity Simulation Overview**

# The Organizations

There are six organizations in the simulation:

- City Government (Treasurer Office)
- City Utilities
- Community Bank
- Community Hospital
- K-12 School District
- Private Sector Business







# **Simulation Overview**

# Community of Roadrunner Park

- Next: Four cyber events to test security plans
- Participant Goals:
  - Leverage a framework for cybersecurity planning.
  - Participate in an engaging view of community resilience.
  - Recognize the impact organizations have on the community.





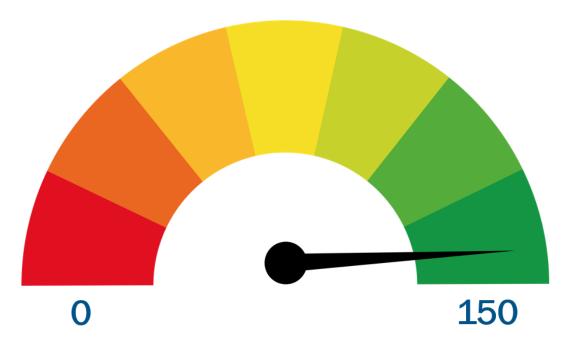


# The Organization's Cyber Resilience Score

# Initial *Cyber Resilience Score (CRS)* of **150** points.

- The CRS represents business continuity capability
- CRS score can change due to:
  - Organizational Impact
  - Community Impact

# Cyber Resilience Score





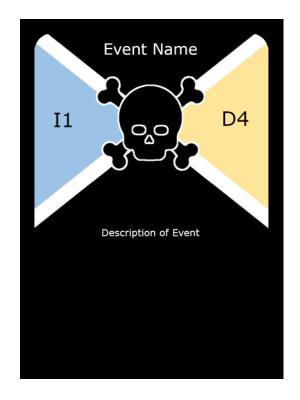


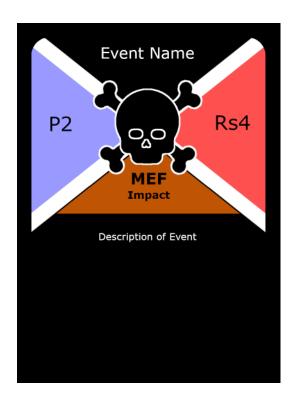
# **Simulation: Inject Phase**

Identify the impact.

# Characteristics of an Inject:

- Event Name
- Event Description
- Impacted Subcategories
- Potential: MEF Impact







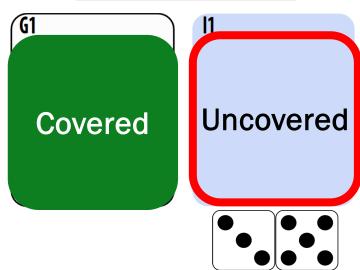


## **Simulation: Response and Recovery Phase**

#### 1. READ INJECT

- SLIDE Reveals the inject
- READ Review inject
- 2. **DETERMINE IMPACT** For each impact:
  - COVERED Success
  - UNCOVERED Impacted
    - ROLL Roll two die and add total
    - TOTAL Represents CRS points lost
- 3. UPDATE SCORE Add lost points to Score Sheet





CATEGORIES	EVENT 0
IMPACT 1	0
IMPACT 2	8





## **Simulation: Scoring Phase**

Scoring is updated on each Group's Score Sheet.

Scores can be impacted by:

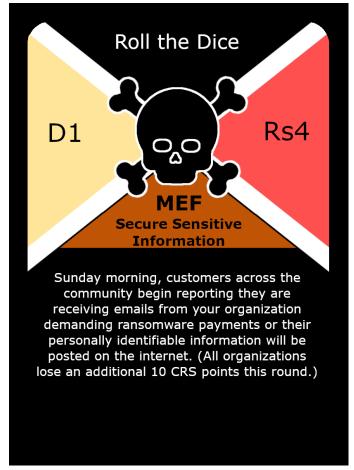
- Successful cyber incidents
- Community-wide incident

SCORABLE CATEGORIES	SCORING RULES	EVENT 0 (PRACTICE)	EVENT 1	EVENT 2	EVENT 3	EVENT 4
IMPACT 1	Uncovered, roll 2 dice					
IMPACT 2	Uncovered, roll 2 dice					
ORGANIZATIONAL MEF	If <u>you</u> are impacted, lose points					
COMMUNITY MEF	If <u>anyone</u> is impacted, lose points					
END OF THE ROUND, EVENT SUBTOTAL	<b></b>					
ADJUSTMENTS						
ORGANIZATION'S CRS POINT TOTAL	150					





## **Practice: Event 0 Activity (5 Min)**



SCORABLE CATEGORIES	SCORING RULES	EVENT 0 (PRACTICE)
IMPACT 1	Uncovered, roll 2 dice	
IMPACT 2	Uncovered, roll 2 dice	
ORGANIZATIONAL MEF	If <u>you</u> are impacted, lose points	
COMMUNITY MEF	If <u>anyone</u> is impacted, lose points	
END OF THE ROUND, EVENT SUBTOTAL		
ORGANIZATION'S CRS POINT TOTAL	150	





## Remember . . .

- This is a simulation.
- There is an element of chance due to its gamification presentation.
- Don't fight the scenario.
- The intention of this activity is to facilitate discussion of cybersecurity topics and strategies in a fun way.







### **Simulation Details**



- This simulation:
  - Represents a city-wide cyber-attack.
  - The attack occurs over a one-week time frame.
- Planning Stage Complete:
  - All covered cybersecurity controls have been implemented in your organization.
  - Additional resources and budget for planning activities are NOT possible in between events.





# **Event 1**

## **Event 1: Inject Actions**

In your organization's group:

- Review and discuss the Inject.
- For each impacted planning sub-category:
  - If the sub-category is covered, do nothing.
  - If the sub-category is NOT covered, roll two dice and deduct points equal to the sum of the dice from your Cyber Resilience Score.
- Your Reporter should be prepared to discuss the inject and the impact on your organization with the group.

1:00

2:00

3:00

4:00

5:00





### **Event 1: Lost Assets**

Monday morning, a key person in your office notifies the IT staff that their laptop has been stolen when they left their computer bag unattended.





P3 Encryption



D4 Mobile Device Management







## **Community Events 1**

**Schools** – An email promising a free vacation is sent to all personnel in the school district.

**Hospital** – Email sent to employees requiring them to click the link to install a software update. When clicked nothing happened.

**Bank** – The CEO reported a laptop stolen.

**Utilities** – The VOIP phone system stopped working

**Local Businesses** – Cyber attack identified. Software customer accounts have been compromised. The biggest customer are county governments.





## **Event 1: Information Sharing Trigger**

- If you covered both:
  - Identify 3: Information Sharing –
     Collection
  - Respond 3: Incident Reporting & Communication
  - Receive one additional planning card.

Review your unused planning cards, select one and cover an uncovered spot on the board.







# **Community Cybersecurity Information Sharing**

- What is information sharing and why is it essential for community cybersecurity?
- Low-cost solutions can help organizations achieve more with less.
- Consider joining:
  - MS-ISAC, TxISAO, and ACTRA
  - InfraGard
  - AIS/HISN







# **Event 2**

### **Event 2: Backdoor**

Monday morning, your office receives a phone call from your outsourced software firm that serves multiple county government offices.

You are notified that the firm has experienced a cyber incident and your office should shut down any computers using the software.

The firm has shut down its servers and vital data storage services will be down for several days.

MEF IMPACT



G2 Risk management



I4 Supply chain management







## **Community Events 2**

**Schools** – Flooded with phone calls from parents asking where to pick up their children because the school is closing due to a gas leak.

#### MEF COMPROMISE ALL ORGANIZATIONS LOSE 10 POINTS

**Hospital** – Breach from a phishing email. Forced to shut down many non-essential computers to contain malware. MEF IMPACT

Bank – The mortgage loan process is down. All loan processing is halted. MEF IMPACT

**Utilities** – Garbage pickup is delayed due to traffic signal malfunctions. The automated vehicle tracking system is down. Drivers report vehicles are malfunctioning and shutting down.

**Businesses** – The online credit card system is compromised. Customers are notified. MEF IMPACT



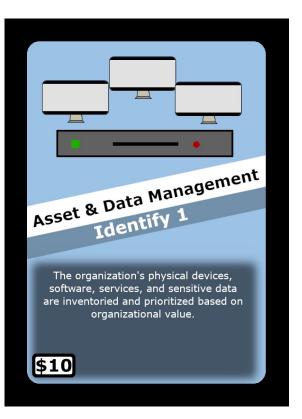


## **Event 2: MEF and High Value Asset Trigger**

- If you covered both:
  - Govern 1: Organizational Priorities
  - Identify 1: Asset & Data Management
  - Receive one additional planning card.

Review your unused planning cards; select one and cover an uncovered spot on the board.





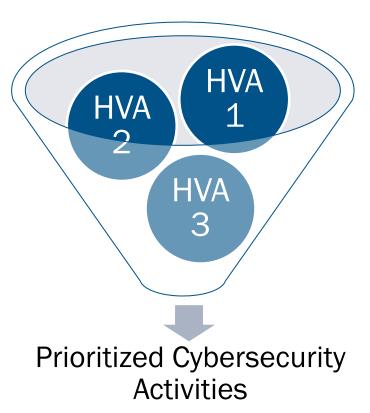




## Relationship Between Mission, Assets and Priorities

HVAs can be any information or information system that relates to one of the following categories:

- Informational value
  - Information or information system that processes, stores or transmits the information is of high value.
- Mission essential
  - The organization owning the information or information system cannot accomplish its mission essential functions (MEF) within expected timelines without the information or information system.
- Protective assets
  - The assets serving critical functions for maintaining security or resilience.







# **Event 3**

## **Event 3: Cash Only**

Wednesday morning, several customers report they could not make online payments for county services.

Out of an abundance of caution, the county leaders decide to have the impacted servers taken off line.

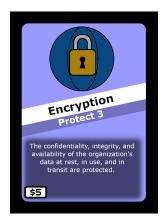
Online payment services across the county government are suspended until the situation can be assessed.

MEF IMPACT affecting whole community. – 10 points



#### **Planning Board IMPACT:**

P4 Backups



Rc2 System and data recovery





## **Community Events 3**

**Schools** – Ransomware attack. The network is down. Teachers and administrators report they cannot access any data. MEF IMPACT.

**Hospital** – Environmental and mechanical industrial control systems are not working such as HVAC, elevators, and others.

**Bank** – Reports of ATMs malfunctioning (not working or dispersing random amounts of money). MEF IMPACT.

**Utilities** – The water SCADA system is down. Shutting off water to citizens and businesses. MEF IMPACT affecting whole community. – 10 points

**Local Businesses** – Reports of e-commerce customer accounts have been altered. MEF IMPACT.



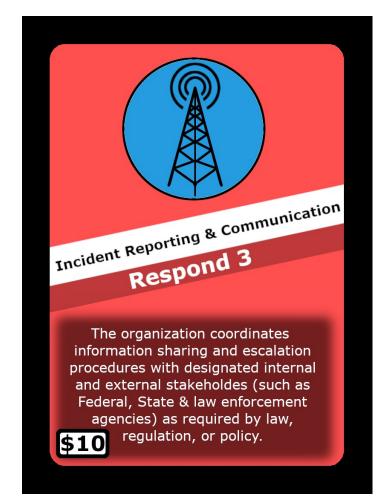


## **Event 3: Federal/State Assistance Special Action**

You may be eligible for Federal/State assistance if you covered Respond 3: Incident Reporting & Communication.

- Federal/State assistance may be available, but resources are limited. Thus, only one organization may receive assistance.
- The assistance priority is: City Government, City Utilities, Community Hospital, K-12 School District, Community Bank and then Local Businesses.

Review your unused planning cards, select one, and cover an uncovered spot on the board.





## Federal/State Assistance is Limited

- Post-attack federal assistance is limited:
  - Most federal assistance involves information sharing.
  - Fly-away and recovery teams are extremely limited.
  - In a significant attack, criminal and national security considerations may prevent disclosure.
- State-based assistance is highly contingent on the specific state and services they provide.

In both cases, advanced contact and planning are crucial to improving the chance of receiving assistance.





# **Event 4**

## **Event 4: Data Entry Dilma**

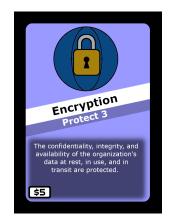
Friday afternoon, your office receives multiple phone calls from different county offices. They are reporting that their accounts seem to reflect incorrect amounts of money.

When accounts are pulled up, all entry amounts say \$5.

MEF IMPACT affecting whole community. – 10 points

**Planning Board IMPACT:** 

**D3 Virus Protection** 



Rs3 Incident Reporting and communication







## **Community Events 4**

**Schools** – Janitorial service suffered a breach several months ago and are now required to notify customers.

**Hospital** – ER computers are not available. Staff report patient records have been altered or deleted. Hospital begins to reschedule surgeries and send patients to other facilities. MEF IMPACT

**Bank** – Customers report they are unable to make investment trades. MEF IMPACT

**Utilities** – Computers and pumping systems are down for water and wastewater. No Water in the community and sewage backs up. Several intersections around the county courthouse and other locations are flooded with sewage. MEF IMPACT affecting whole community. – 10 points

**Local Businesses** – Remote employee reports sluggish computer. IT personnel find updates have not been performed on the laptop.



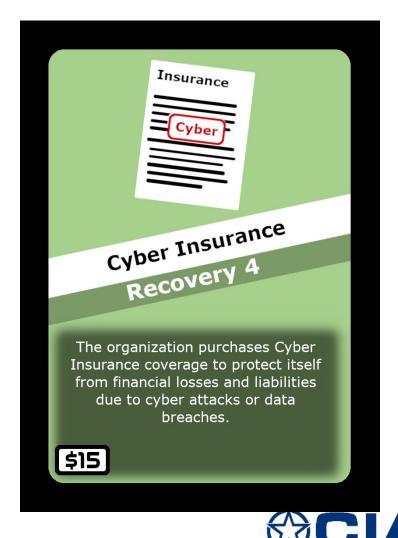
# **Event 4: Cyber Insurance**

If you covered Recovery 4: Cyber Insurance, receive 25% of your lost points back. (Rounded up)

Points Lost	25%
2	1
6	2
10	3
14	4
18	5
22	6
26	7
30	8
34	9

Points Lost	25%
38	10
42	11
46	12
50	13
54	14
58	15
62	16
66	17
70	18

Points Lost	25%
74	19
78	20
82	21
86	22
90	123
94	24
98	25
102	26
106	27





## **Cyber Insurance**

#### **First Party**

- Incident Management, Analysis & Containment
- System & Data Recovery
- Legal Services
- Public Relations, Notification& Call Center
- Business Interruption
- Cyber Extortion

#### **Third Party**

- Broad coverage for failure to protect data
- Vicarious liability coverage for vendors (Business Associates, Tech Providers (SaaS, PaaS, etc.))
- Regulatory fines & penalties
- Civil & Class Action Defense

#### **Typical Exclusions**

- Poor security processes
- Prior breaches
- Human Error
- Insider attacks
- Pre-existing vulnerabilities
- Technology system improvements
- Force Majeure





## Other Considerations - Physical Event Causing a Cyber Outage

#### **EXTENDED INTERNET OUTAGE**

A substation was shot at in the early morning. The attack required repairs that cost more than \$250,000 causing a power outage in your area.

As of April 2024, the average lead time for a substation transformer is 120 weeks, but can range from 80 to 210 weeks.

This is due to supply shortages and an inflexible market. In 2021, the lead time was around 50 weeks.







## **Summary**

#### Your Takeaways:

- Develop or Update your Continuity Plans.
- Know what your high value assets and organizational mission essential functions are.
   Communicate these with your IT Department.
- Experienced how mission essential function failure can have cascading effects throughout a community.
- Make connections to help.





## **Thank You**



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### **Panel Discussion Considerations**

- Develop or Update your Continuity Plans. How often do you update plans?
- Know what your high value assets and organizational mission essential functions are.
   Communicate these with your IT Department.
- Experienced how mission essential function failure can have cascading effects throughout a community. Include community organizations that could impact your mission essential functions.
- Include how/when you will ask for State and Federal cyber incident response capabilities.
- Do you have or do you want cyber insurance?
- Consider creating a county treasurer working group for the State of Ohio for information sharing.



