Incident Response

Incident response is the process of responding in an organized manner to a compromise or attempted compromise of organizational information technology assets

Example includes
Malware attack
also

Basic Definitions

Event

Adverse events

Computer Security Incident

Preparation

Incident response policy

Incident response plan

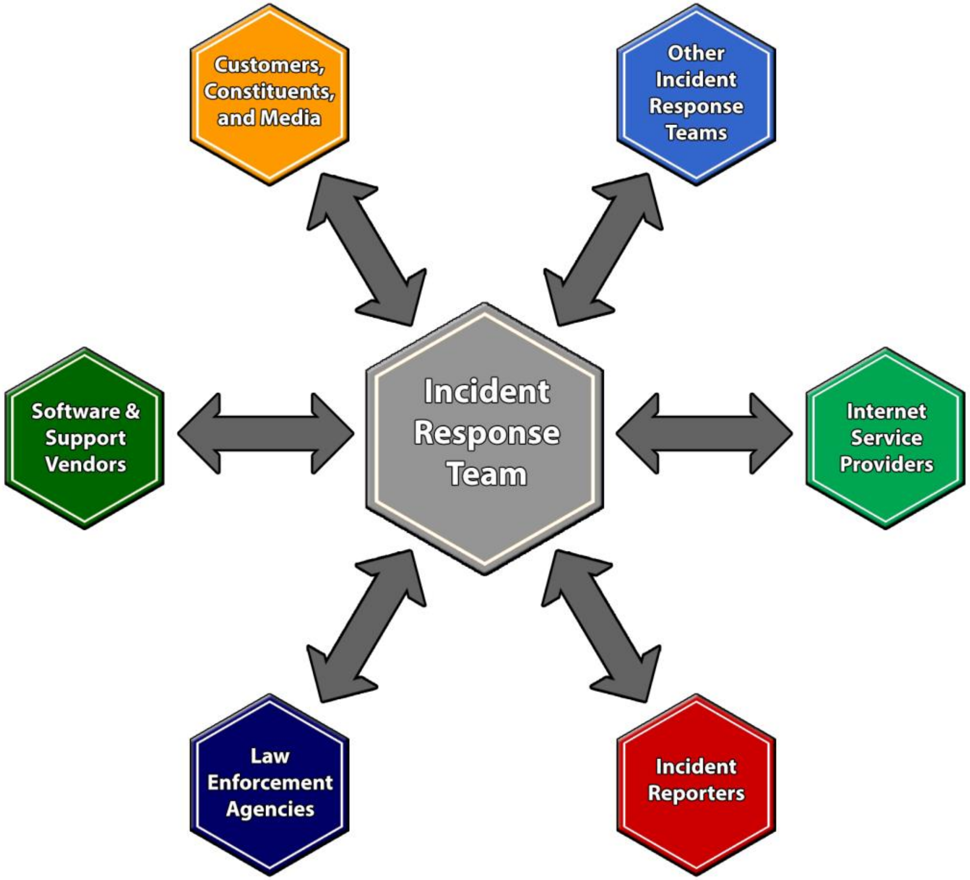
Related incident response procedures

Incident Response Tools

Specific software may be needed for incident-handling activities such as forensics analysis

Communication Planning

important!


Customers, Constituents, and Media
Other Incident Response Teams
Software & Support Vendors
Incident Response Team
Internet Service Providers
Law Enforcement Agencies
Incident Reporters

Communication with Law Enforcement

- Law enforcement reporting will vary by country, state, economy, and jurisdiction
- Forensics policy, standards, and procedures should contain requirements as noted by the law enforcement partner

Media

All members of the incident response process should be aware of how to interact with the media

Provide accurate and timely updates to the media

The Incident Response Team

- Virtual teams: All members have other regular duties
- Some organizations have permanent team members eg used for DR also.
- Hybrid: Certain permanent core members and others called up as necessary
- Centralized vs. Decentralized

Other Considerations

- Contact information
- On-call information for other teams
- Issue tracking system
- Smartphones
- Encryption software
- War room
- Secure storage facilities
- Incident analysis

Detection and Analysis

- Events may have a negative impact, they will not necessarily be classified as security incidents
- Indicator
  - An event that means an incident is actually occurring or has occurred

Automation using Tools.

- Precursor
  - An event that may signal an incident in the future

Vulnerability assessments.

Common Sources of Precursors and Indicators

NIST SP 800-62 Rev2 provides “Common Sources of Precursors and Indicators”

Types of Intrusion Systems

Network-based intrusion systems

anything plugged into the computer.

Host-based intrusion systems

Intrusion Detection Techniques

Signature- or pattern-matching systems

Protocol-anomaly-based systems

Statistical-anomaly-based systems

AI using Heuristics

False Positives and False Negatives

False positives occur when the IDS or IPS identifies something as an attack, but it is in fact normal traffic

too late.
Hard to detect.

False negatives occur when it failed to interpret something as an attack when it should have

Systems Security
Certified Practitioner

Anti-Malware Systems

To remain effective, anti-malware solutions:

- Require continual updates
- Must be monitored to ensure they are still active and effective

Security Information Event Management (SIEM)

- Provide a common platform for log collection, collation, and analysis in real time
- Historical reporting capability

→ Splunk

→ QRADAR

Incident Analysis

Incident analysis focuses on understanding what constitutes an incident in the organization instead of drive-by scans, abnormal behavior, or new system configurations

Response

- **When an incident is detected, a containment strategy must be decided**
- **Containment may include:**
  - Disconnecting devices from the network
  - Shutting systems down
  - Redirecting traffic

Containment Strategy Considerations

Need to preserve forensic evidence for possible legal action

Availability of services the affected component provides

Potential damage leaving the affected component in place may cause

Time required for the containment strategy to be effective

Resources required to contain the affected component

Delaying Containment

There may be legal implications if the organization knows about the compromised system and then the compromised system is used to attack another system

Triage

An analysis of the incident must be performed to determine the overall impact

The assessed impact level of the incident dictate the actions that should be taken

Common Containment Activities

Backing up the affected system ← not if it's ransomware

Disconnecting the affected system careful! ↓

Changing system, application, and user passwords

Analyzing network traffic

Modifying firewall rules

Reviewing system, application, and security logs

↑ learn

Post-Incident Activity

A post-incident report should document the security incident and all recovery activities

Update incident response policy and procedures based on lessons learned

Forensics Investigations

Identifying evidence

Collecting or acquiring evidence

Examining or analyzing the evidence

Presentation of findings

Criminal Behavior

- Behavior is intentional and serves to fulfill some purpose
- Computer criminals have specific MOs and leave behind signature behaviors

General Guidelines

All of the general forensic and procedural principles must be applied

Actions taken should not change evidence

Train people who access original digital evidence

All activity relating to digital evidence must be fully documented, preserved, and available for review

Individual is responsible for all actions taken with respect to digital evidence while it is in his possession

Five Rules of Evidence

- Be authentic
- Be accurate
- Be complete
- Be convincing
- Be admissible

Types of Analysis

- Media
- Network
- Software
  - Author Identification
  - Content Analysis
  - Context Analysis
- Hardware/Embedded Device

Emergency Response Plans and Procedures

Have plans to recover and restore operations

Key personnel must receive training

Plans must be tested to ensure effective execution

Plans must be constantly reviewed and updated

Maximum Tolerable Downtime (MTD) → Important abbrev. for SSCP

Maximum amount of time that a business function can be unavailable before the organization is harmed to a degree that puts the survivability of the organization at risk

Recovery Time Objective (RTO)

The period of time within which a business function or information system must be restored after a disruption

Recovery Point Objective (RPO)

Data

The point in time to which data could be restored in the event of a business continuity disruption

Business Impact Analysis (BIA)

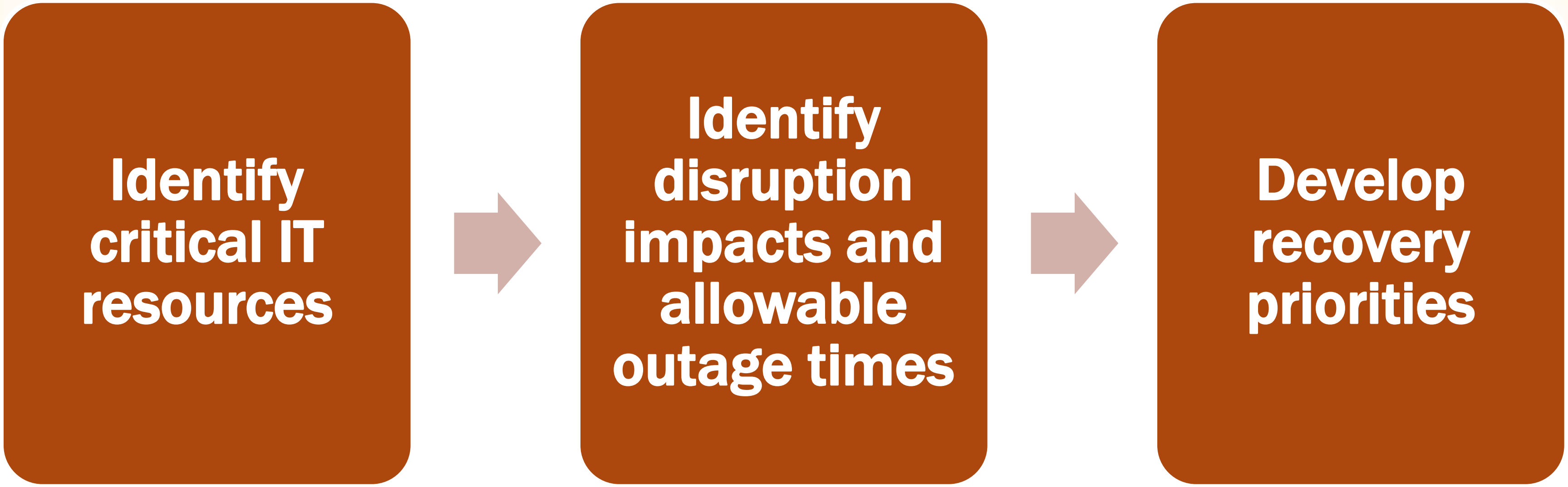
- Assesses impacts to an organization that would result from a business disruption
- Aids in the identification of critical organizational functions
- Helps determine recovery time objectives

Stakeholder Input

Conducting a BIA requires participation from stakeholders in all organizational business units

- Direct interviews with stakeholders
- BIA questionnaires
- Review of organizational policies and procedures
- Reviews of organizational contractual requirements

BIA Project Stages



Identify critical IT resources

Identify disruption impacts and allowable outage times

Develop recovery priorities

Disaster Recovery Planning

- Focuses on the restoration of IT functions after a business disruption event
- Details the steps to restore critical IT systems in the event of a disaster

Types of Backups

Backup Type	Data Backed Up	Time to Complete
Full Backup	All data are copied to backup media	The full system backup takes the longest time to complete
Differential Backup	A differential backup provides a backup of files that have changed since a full backup was performed. A differential backup saves the files that are different or new since the last full backup	The differential backup takes less time than the full system backup but more time than an incremental backup
Incremental Backup	An incremental backup provides a backup of files that have changed or are new since the last incremental backup	The incremental backup is the fastest backup type to perform when compared with full and differential backups

Off-Site Storage

- Backup tapes should be stored off-site at a secure location
- Ensure that they are available for restoration should the primary facility become unavailable

Electronic Vaulting

Appliance sits at the source location

Collects data backups from individual systems

Transmits them to the vendor location

The backup is encrypted

Data backups may be restored from the electronic vault to the source system

Remote Journaling ← like an event log

Journals and database transaction logs are transmitted electronically to an offsite location

Transaction logs can then be applied against a copy of the database at the offsite location

The offsite copy can be restored quickly

Clustering

- Clustering refers to a method of configuring multiple computers so that they effectively operate as a single system
- Can be performed for:
  - High-availability
    - Active / Passive
  - Load balancing
    - Active / Active

RAID Levels

RAID 0 – Striped Set

RAID 1 – Data Mirroring

RAID 5 – Striped Set with Parity

RAID 10 (1+0) – Data is mirrored then striped

Testing and Drills

- Checklist Test
- Structured Walkthrough Test
- Simulation Test
- Parallel Test
- Full Interruption Test

Plan Review and Maintenance

- Review BCPs and DRPs:
  - On an annual basis, at a minimum
  - After significant changes
- Ensure that the plan is continually up to date