Nebraska Information Technology Commission

STANDARDS AND GUIDELINES

Incident Response Standard

Category	**Security Architecture**
Title	**Incident Response Standard**
Number	

Applicability

☑ State Government Agencies
- ☐ **All** ..... Not Applicable
- ☑ **Excluding higher education institutions** .....Standard

☐ State Funded Entities - **All entities receiving state funding for matters covered by this document** ..... Not Applicable

☑ Other: **All Public Entities**..... Guideline

Definitions:
Standard - Adherence is required. Certain exceptions and conditions may appear in this document, all other deviations from the standard require prior approval of _____.
Guideline - Adherence is voluntary.

Status	☐ **Adopted**	☐ **Draft**	☐ **Other:**_____
Dates	**Date:** **Date Adopted by NITC:** **Other:**		

Prepared by: Technical Panel of the Nebraska Information Technology Commission
Authority: Neb. Rev. Stat. § 86-516(6)
http://www.nitc.state.ne.us/standards/

1. Purpose and Objectives

Computer systems are subject to a wide range of mishaps; from corrupted data files, to viruses, to natural disasters. These mishaps can occur at anytime of the day or night. Many mishaps are fixed through day-to-day operating procedures, while more severe mishaps are addressed in other plans, e.g. Continuity of Operations (COOP) plans. In some cases, incident handling actions will not be performed by a single person or on a single system. Responses to an incident can range from recovering compromised systems to the collection of evidence for the purpose of criminal prosecution. Therefore, preparation and planning for incidents, and ensuring the right resources are available, are critical to an agencies ability to adequately detect, respond and recover.

A formally documented and coordinated incident response capability is necessary in order to rapidly detect incidents, minimize loss and destruction, mitigate exploited weaknesses, and restore computing services. It prepares agencies to: efficiently respond, protect systems and data, and prevent disruption of services across multiple platforms and between agencies across the State network. Incorporated within these standards are accepted best practices within the law enforcement and Information Technology (IT) security communities. These standards will facilitate cooperation and information exchange among those responsible for responding to and reporting on incidents on any State of Nebraska information system.

2. Standard

It is the responsibility of all State of Nebraska agencies that support information systems to develop, disseminate, and periodically review/update a formal, documented, incident response capability that includes preparation, analysis, containment, eradication, and recovery. In addition, lessons learned from prior and ongoing incident activities should be incorporated into the incident response capability. Agency plans should cover all potential types of incidents, including but not limited to:

- Information system failures and loss of service;
- Denial of service;
- Breaches of confidentiality

In addition to plans that recover systems or services as quickly as possible, the plan should also cover:

- Analysis and identification of the cause;
- Planning and implementation of remedies to prevent recurrence, if necessary;
- Collection of audit trails and similar evidence;
- Communication with those either affected by or potentially affected by the incident; and
- Reporting the incident

2.1 Incident Response Team

Agencies should identify knowledgeable staff that can rapidly respond to, manage, and support any suspected incident to minimize damage to State information system(s), network(s) and data by identifying and controlling the incident, properly preserving evidence, and reporting to appropriate entities. An agency contact list should be developed and maintained for incident response personnel, which includes the names, telephone numbers, pager numbers, mobile telephone numbers, e-mail addresses, organization names, titles, and roles and responsibilities for all key incident response resources, including but not limited to agency personnel and management, other key state agencies, vendors, and contacts.

2.2 Initiate an Incident Log

Documentation of information is critical in situations that may eventually involve authorities, as well as provides a historical event of the actions taken to resolve the event. Manually written incident logs are preferable since electronic logs can be altered or deleted. The minimum information that should be recorded is:

- When (date and time) and how the incident was reported, discovered or occurred;
- Who reported or discovered the incident;
- Description of the incident;
- Incident-related tasks and who performed each, and the amount of time spent on each task;
- Individuals contacted regarding the incident; and
- Information system(s), program(s) or network(s) affected.

2.3 Classification of Incidents

The agency Information Security Officer (ISO) should review the incident information to determine if an actual incident has occurred. Incidents are classified into four tiers based on the severity of the incident: Tier 1, Tier 2, Tier 3, or Tier 4.

Tier	Definition	Examples	Report to SISO	Activate Agency IRP
1	Localized, minor incidents. Non-critical systems.	- Localized virus attacks - Internet abuse that results in disciplinary action, excluding criminal behavior - Incidents traceable to user error or system failure - Sustained attempts at intrusion, scanning or pinging of state devices - Missing IT devices or equipment with storage capabilities	Report to the SISO within one business day	No
2	Incidents affecting critical systems or information; or affecting more than one agency.	- Coordinated, distributed attacks - Any attack which causes Denial of Service - Financial fraud - Unauthorized activity involving a server, host, or Confidential system (HR, Legal, Financial, etc.) - Theft of proprietary information - Internet abuses violating Federal/ State law - Theft of IT devices with storage capabilities	Report verbally to the SISO immediately for determination of escalation, and/or assistance.	Yes
3	Incidents impacting multiple agencies	- Service provider outage - Core network outage - Mainframe outage	Report verbally to the SISO immediately.	Yes
4	Governor declared emergency	- Activation of COOP Plan	No	As directed

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2.4 Cyber Security Incidents

Each agency shall securely maintain any information collected, generated, or assessed in the course of determining whether an incident is a potential cyber security incident warranting prosecution. Data collection shall focus on identifying who, what, when, where, and the how of an incident. Collected information shall be properly documented and safeguarded. Evidence such as system and network log files, user files, system administrator logs and notes, backup-up tapes, and intrusion detection system logs, alarms or alerts shall be securely maintained and the chain of custody preserved by:

- Ensuring the evidence has not been altered;
- Ensuring the evidence is accounted for at all times;
- Verifying the passage of evidence from one party to another is fully documented; and
- Verifying the passage of evidence from one location to another is fully documented.

If an incident is determined not to be a cyber security incident, agencies are still required to maintain any evidence and its chain of custody because future incidents may require the previously captured evidence.

2.4.1 Security Incident Evidence File

An evidence file shall be created to record and maintain an inventory of all actions taken, action timestamps and correspondence associated with a security incident.

2.4.2 Notification of Personal Information Security Breach

Agencies shall determine if the incident resulted in a breach to a system containing personal information and then notify affected individual as required by Neb. Rev. Stat. § 84.121 or other State or Federal regulatory guidelines.

2.4.3 Security Incident Confidentiality

Communication shall be on a need-to-know basis and shall be considered confidential during a security incident investigation. Incident responders are not to share any details with anyone other than the Incident Response team, agency management or the State Information Security Officer (SISO) (see Section 2.12)

2.5 Reporting to the State Information Security Officer

Agencies shall report incident information to the SISO. The SISO will contact appropriate authorities in accordance with State or Federal incident reporting procedures, applicable laws, directives, policies, regulations, standards, and procedures; and to US-Cert and law enforcement, if necessary. Reporting to the SISO does not relieve agencies from other reporting requirements.

The SISO has the responsibility to inform other agencies about incidents impacting multiple agencies that may become a potential threat.

2.6 Escalation Process

Agencies should periodically review the incident conditions and determine if escalation to a higher tier is appropriate. An incident may be escalated in any of the following ways:

- Determination by the Chief Information Officer or State Information Security Officer;
- Additional related events (i.e. emergence of a distributed, coordinated attack, etc.)
- Requested by agency management.

2.6.1 Escalation Thresholds

Agencies should consider escalating an incident when certain conditions are met. The following thresholds of incident actions are examples of when to consider incident escalation:

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- Multiple machines per LAN segment showing Intrusion Prevention System signature;
- Multiple machines showing multiple Intrusion Prevention System signatures;
- One or more critical infrastructure/application showing Intrusion Prevention system signatures;
- Significant impact on bandwidth;
- When a concerted effort is shown to be attacking the network, either internally or externally;
- Any known or reported compromise of Personal Identifiable Information (PII);
- Any website defacement.
- Abnormal increases in any of the above.

2.7 Response to Incidents

Priority in incident response is given to preventing further damage to State information systems. Therefore, the Office of the CIO reserves the right to quarantine any potentially threatening agency or system.

2.7.1 Incident Containment

Agencies shall identify containment strategies to control an incident's impact to compromised systems, limit the extent of the incident, prevent further damage and regain normal operations of affected systems. Agency containment measures should take into consideration available resources, the classification of an incident, agency Continuity of Operations Plans (COOP) and procedures regarding response methods. Containment measures shall also be evaluated against the potential loss or corruption of security incident evidence. Containment methods shall include as a minimum:

- Ensuring redundant systems and data have not been compromised;
- Monitoring system and network activity;
- Disabling access to compromised shared file systems;
- Disabling specific system services;
- Changing passwords or disabling accounts;
- Temporarily shutting down the compromised or at risk system; and
- Disconnecting compromised or at risk systems from the network.

2.7.2 Incident Eradication

Agencies shall develop and employ mitigation strategies prior to returning compromised systems to service to protect against like or similar types of incidents in the future. Mitigation strategies may include, but are not limited to:

- Changing passwords on compromised systems;
- Disabling compromised accounts;
- Identifying and removing an intruder's access method
- Installing system patches for known weaknesses or vulnerabilities;
- Adjusting or deploying firewall or intrusion detection system technologies to detect access and intrusion methods;
- Code changes to internal applications.

2.8 Recovery

Agencies shall evaluate and determine when to return compromised systems to normal operations. Access to compromised systems shall be limited to authorized personnel until the security incident has been contained and root cause mitigated. Analysis and mitigation procedures shall be completed as soon as possible, recognizing agency systems are vulnerable to other occurrences of the same type. Recovery procedures shall address:

- Recovery Requirements. The agency shall define and prioritize the requirements to be met before returning an affected or compromised system to normal operations. Recovery strategies may include, but are not limited to:
  - Reinstalling compromised systems from trusted backup-ups; and
  - Reinstalling system user files, startup routines, or settings from trusted versions or sources;
- Validate Restored Systems. Agencies shall validate the restored systems through system or application regression tests, user verification, penetration tests, and vulnerability testing and test result comparisons.
- Increased Security Monitoring. The agency shall heighten awareness and monitoring for a recurrence of the incident.

2.9 Follow-up Analysis

After an incident has been fully handled and all systems are restored to a normal mode of operation, a follow-up analysis should be performed within three to five days of recovering from the incident to discuss actions that were taken and lessons learned. Extended delays may reduce the effectiveness of relating critical information. Follow-up analysis include a review of the chronological events, identifying all containment and eradication actions taken, identification of mitigation strategies, examining the lessons learned, and assessing the incident costs. Questions to be addressed may include, but are not limited to:

- Did detection and response systems work as intended? If not, what methods would have prevented the incident?
- Are there additional procedures that would have improved the ability to detect the incident?
- What improvements to existing procedures and tools would have aided in the response process?
- What improvements would have enhanced the ability to contain the incident?
- What correction procedures would have improved the effectiveness of the recovery process?
- What updates to agency policies and procedures would have allowed the response and recovery processes to operate more smoothly?
- How could user and system administrator preparedness be improved?
- How could communication throughout the detection and response processes be improved?
- Was the incident previously identified as a potential threat?
- What was the impact in terms of financial loss, loss of public or customer trust, legal liability, or harm to public health and welfare?

Results of these questions should be documented and incorporated into existing procedures, if necessary.

2.10 Incident Response Training

2.10.1 All Users

Agencies should provide education and awareness programs for users in incident response procedures and reporting methods. The programs shall address:

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- What types of events are incidents;
- Agency notification procedures; and
- Existing and emerging threats.

2.10.2 Agency IT Staff

Agency staff responding to incidents are encouraged to obtain the following training, according to their roles and responsibilities:

- State and Federal security and privacy laws and procedures
- Technical training on all platforms, operating systems and applications they may be responding to.

2.11 Incident Response Testing

Testing should be conducted at least annually, either in response to an identified incident or as part of a formal readiness test, using defined tests, simulated events, and exercises to determine the effectiveness of the incident response capability.

2.12 Release of Information

Control of information during the course of an incident or investigation of a possible incident is very important. Only the affected agency can authorize the release of all incident information. Specific information concerning the incident, such as accounts involved, programs or system names, are not to be provided to any callers regardless of who they claim to be.

3.0 Applicability

3.1 State Government Agencies
All State agencies, boards, and commissions are required to comply with the standard listed in Section 1.0.

3.2 Exemption
There is no exemption allowed to this Standard by any agency, board, or commission.

4.0 Responsibility

4.1 NITC
The NITC shall be responsible for adopting minimum technical standards, guidelines, and architectures upon recommendation by the technical panel. (Neb. Rev. Stat. § 86-516(6))

4.2 State of Nebraska Information Security Officer
The SISO serves as a security advisor to all State of Nebraska agencies and shall act as the incident response coordinator for the state. In that capacity, the SISO shall perform the following functions:

- Create a statewide incident response reporting procedure and instruct agencies as to the requirements of the procedure.
- Maintain a central list of agency Information Security Officers or incident response point of contact information.
- Receive incident reports, and evaluate, verify, validate and as needed disseminate alerts to State of Nebraska agencies. Alert notification will not include the name of impacted agencies or agency specifics, unless permitted.
- Coordinate with affected agencies in determining the need to disseminate alerts to federal entities, law enforcement, and any other appropriate parties.

4.3 State Agencies
When an incident occurs, agencies must provide a verbal report to the SISO based upon the guidelines listed in section 2.3. A written preliminary report must be completed within two (2) working days using the Incident Reporting Form. This report is to be completed by the individual handling the incident; however all people involved are responsible for providing information regarding their actions. Within ten (10) working days of the resolution of an incident, a written final report must be submitted. In cases where incident resolution is expected to take more than thirty (30) days, a weekly status report must be submitted to the SISO.

Should an incident be serious enough to warrant prosecution, law enforcement will need to demonstrate a chain of custody and provide records of actions taken; therefore a log must be kept, including recovery steps and other regular or routine work performed on the affected system(s). This log should be separate from normal system logs, since it may be used as evidence.

Agencies are responsible for training personnel in incident response capabilities according to their roles and responsibilities.

Agencies that support information systems shall provide a support resource, i.e. a Help Desk, which serves as the primary contact to report incidents.

4.3.1 Agency Incident Response Contacts

Agencies are responsible for providing a primary and secondary point of contact to act as a liaison with the SISO. The agency point of contact can be the agency Information Security Officer (ISO) or some other designee. See Information Security Policy, Appendix B for Roles and Responsibilities of the (ISO).

4.4 Users

All information system(s) users are responsible for understanding their role and complying with agency incident handling procedures. Users must immediately report suspicious activities to their manager and/or agency or State of Nebraska HelpDesk and fully cooperate with personnel tasked with resolving the incident.

5.0 Definitions

Availability. The assurance that information and services are delivered when needed.

Breach. Any illegal penetration or unauthorized access to a computer system that causes damage or has the potential to cause damage.

Chain of Custody. Protection of evidence by each responsible party to ensure against loss, breakage, alteration, or unauthorized handling. Protection also includes properly securing, identifying, and dating evidence.

Compromise. The unauthorized disclosure, modification, substitution, or use of sensitive information, or the successful action to invade system by evading its security. For example, a computer had been compromised when a Trojan horse has been installed.

Confidentiality. The assurance that information is disclosed only to those systems or persons that are intended to received that information.

Continuity of Operations (COOP) Plans – Provides for the continuation of government services in the event of a disaster.

Cyber Security Incident. Any electronic, physical, natural, or social activity that threatens the confidentiality, integrity, or availability of State of Nebraska information systems, or any action that is in violation of the Information Security Policy. For example:

- Any potential violation of Federal or State law, or NITC policies involving State of Nebraska information systems.
- A breach, attempted breach, or other unauthorized access to any State of Nebraska information system originating from either inside the State network or via an outside entity.
- Internet worms, Trojans, viruses, malicious use of system resources, or similar destructive files or services.
- Any action or attempt to utilize, alter, or degrade an information system owned or operated by the State of Nebraska in a manner inconsistent with State policies.
- False identity to gain information or passwords

Denial of Service. An inability to use system resources due to unavailability; for example, when an attacker has disabled a system, or a network worm has saturated network bandwidth.

Incident. An occurrence having actual or potentially adverse effects that causes an interruption of the agency's business activities. It may or may not apply to an Information System.

Incident Response. An organized approach to addressing and managing the aftermath of a security breach or attack (also known as an incident).

Incident Response Team. A group of professionals within an agency trained and chartered to respond to identified information technology incidents.

Information System. A system or application that consists of computer hardware, software, networking equipment, and any data. Such systems include but are not limited to desktop computers, servers, printers, telephones, network infrastructure, E-mail, and web based services.

Integrity. The assurance that information is not changed by accident or through a malicious or otherwise criminal act.

Recovery. A defined step or process within an incident response plan with the goal of returning the affected or compromised systems to normal operations.

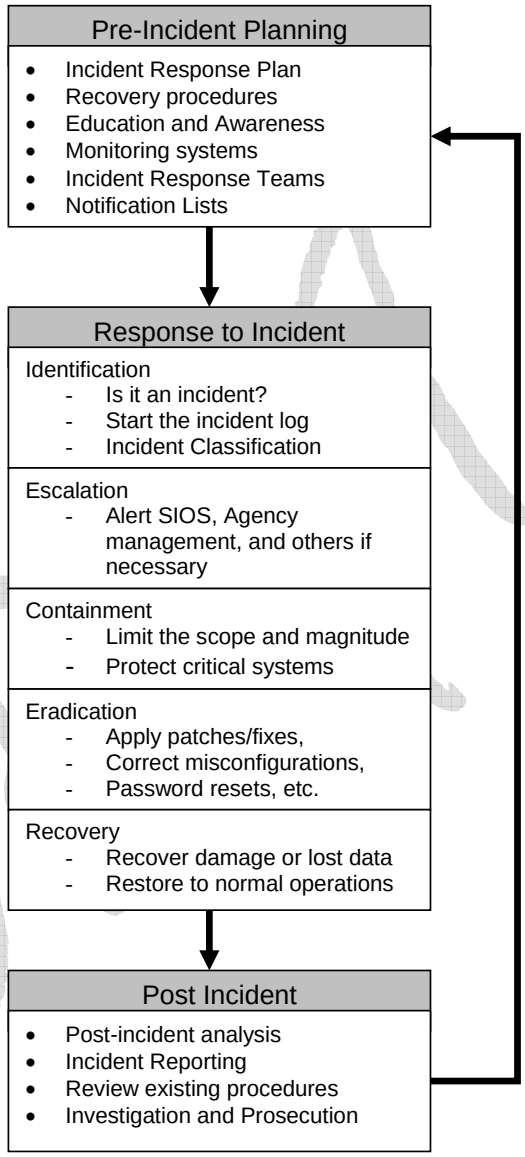
6.0 Related Documents

6.1 NITC Security Officer Handbook (http://www.nitc.state.ne.us/standards/security/so_guide.doc)
6.2 NITC Information Security Policy (http://www.nitc.state.ne.us/standards/index.html)
6.3 State of Nebraska INCIDENT RESPONSE FORM – Attachment A

7.0 References

7.1 National Institute Standards and Technology (NIST) Special Publication, 800-61, "Computer Security Incident handling Guide." (http://csrc.nist.gov/publications/nistpubs/800-61/sp800-61.pdf).

State of Nebraska
Incident Handling Lifecycle



State of Nebraska INCIDENT RESPONSE FORM

This form is based on the State of Nebraska Incident Response Standard, which agencies are required to use when reporting an incident. An automated version of this form can be found at ??????????. For urgent assistance, contact the State Information Security Officer at (402) 471-7031 or 416-3668.

1. Point of Contact Information for this Incident:

Name:	Agency:
Phone:	Cell/Pager:

2. Physical Location of Affected Computer/Network:

(include building number, room number, etc)

3. Date and Time Incident Occurred and Duration:

(mm/dd/yy)	(hh:mm:ss am/pm)	Duration:

4. Type of Incident (check all that apply):

☐ Intrusion	☐ Access Control Avoidance
☐ Denial of Service	☐ Unauthorized Access
☐ Virus / Malicious code (complete 4a)	☐ User Account Compromise
☐ System Misuse	☐ Hoax
☐ Social Engineering	☐ Network Scanning / Probing
☐ Technical Vulnerability (complete 4b)	☐ Root Compromise
☐ Equipment Missing or Lost (complete 4c)	☐ Web Site Defacement
☐ Equipment Stolen or Damaged (complete 4c)	☐ Other (specify)

4a. Provide the name(s) of the virus(es) and any URLs used to obtain information specific to the virus. Provide a synopsis of the incident and any actions taken to disinfect and prevent further infection.

4b. Generally describe the nature and effect of the vulnerability. Describe the conditions under which the vulnerability occurred and the specific impact of the weakness or design deficiency. Has the application vendor been notified?

4c. Provide the make, model, serial number, and tag number:

5. Information on Affected System:

IP Address:	Computer/Host Name:	OS (include release number):	Other Applications:

6. Information on Affected Hardware/Software:

(include version and release information)

7. Number of Host(s) Affected:

☐ < 10 ☐ 10 to 50 ☐ 50 to 100 ☐ > 100

8. IP Address of Apparent or Suspected Source:

Source IP Address:	Other information available:

9. Incident Assessment:

Is this incident a threat to life, limb, or a critical agency service? ☐ Yes ☐ No If yes, elaborate:

List the most restricted classification of the data residing on the system.

Damage or observations resulting from the incident:

10. Information Sharing:

Who can this information be shared with, outside the Office of the CIO? (do not leave blank and check all that apply)

☐ Other Agencies ☐ Law Enforcement ☒ US-CERT ☐ **No sharing is Authorized**

11. Additional Information:

If this incident is related to a previously reported incident, include previous incident information

Return this form to: State Information Security Officer, 501 S. 14th Street, Lincoln, NE