

NENA Call Blocking Information Document

Abstract: This Informational Document is intended to provide guidance to PSAPs on developing agency policy on the conditions that should be used to identify a calling number or identifier that is negatively impacting normal PSAP operations as well as the processes for having that source blocked or disposed of until the issue from that source has been resolved.



NENA Call Blocking Information Document

NENA-INF-023.1.1-2020

DSC Approval: 02/25/2020

PRC Approval: 10/27/2017

NENA Executive Board Approval: 11/02/2017

Next Scheduled Review Date: 02/25/2024

Prepared by:

National Emergency Number Association (NENA) PSAP Logistics Committee, Call Blocking Working Group

Published by NENA

Printed in USA



1 Executive Overview

NENA-STA-010, NENA Detailed Functional and Interface Standards for the NENA i3 Solution defines NG9-1-1 Core Services which allow a PSAP to identify the source of a call that is adversely affecting its ability to operate normally and continue receiving legitimate calls. The PSAP also has the ability to request that the Border Control Function (BCF) filters out, block or dispose of subsequent calls from that source. This Informational Document is intended to provide guidance to PSAP Administrators regarding what conditions should be used for a PSAP to identify a calling number or identifier as a problem source and develop a draft policy for having that source blocked or disposed of until the issue from that source has been resolved. This document will also provide guidance on how to determine if the problem is resolved and the criteria to un-block the number or calling source.

This document focuses on threats from individual sources; it does not address Distributed Denial of Service (DDoS) attacks where large numbers of individual sources are coordinated to simultaneously launch attacks. This document does not address call blocking requests to Originating Service Providers.

Table of Contents

1 EXECUTIVE OVERVIEW	2
INTELLECTUAL PROPERTY RIGHTS (IPR) POLICY	5
REASON FOR ISSUE/REISSUE	5
2 CALLING SOURCE AFFECTING OPERATIONS	6
2.1 DEFINING ADVERSELY AFFECTING OPERATIONS.....	6
2.2 SERVICE LEVEL MONITORING.....	6
2.3 PSAP REAL-TIME MONITORING.....	6
3 CALLING SOURCES	6
3.1 AUTO DIALERS	7
3.2 DEVICES AND SENSORS.....	7
3.3 COMPUTER BASED DENIAL OF SERVICE ATTACKS.....	7
3.4 ATTACHMENTS.....	7
4 POLICY RECOMMENDATIONS.....	7
5 PROCEDURE REQUIREMENTS.....	8
6 CONDITION RESOLUTION AND UNBLOCKING OF CALLING SOURCE	9
7 IMPACTS, CONSIDERATIONS, ABBREVIATIONS, TERMS, AND DEFINITIONS	9
7.1 OPERATIONS IMPACTS SUMMARY	9
7.2 TECHNICAL IMPACTS SUMMARY	10
7.3 SECURITY IMPACTS SUMMARY	10
7.4 RECOMMENDATION FOR ADDITIONAL DEVELOPMENT WORK.....	10
7.5 ANTICIPATED TIMELINE	11
7.6 COST FACTORS.....	11
7.7 COST RECOVERY CONSIDERATIONS.....	11
7.8 ADDITIONAL IMPACTS (NON-COST RELATED)	11
7.9 ABBREVIATIONS, TERMS, AND DEFINITIONS.....	11
8 RECOMMENDED READING AND REFERENCES	12
EXHIBIT A: IMMEDIATE CONSIDERATIONS -- CALLING SOURCE IMPACTING OPERATIONS.	13
ACKNOWLEDGEMENTS.....	14

**NENA
INFORMATION DOCUMENT
NOTICE**

This Information Document (INF) is published by the National Emergency Number Association (NENA) as an information source for 9-1-1 System Service Providers, network interface vendors, system vendors, telecommunication service providers, and 9-1-1 Authorities. It is not intended to provide complete design or operation specifications or parameters or to assure the quality of performance for systems that process such equipment or services.

NENA reserves the right to revise this Information Document for any reason including, but not limited to:

- Conformity with criteria or standards promulgated by various agencies,
- Utilization of advances in the state of the technical arts,
- Reflecting changes in the design of equipment, network interfaces, or services described herein.

This document is an information source for the voluntary use of communication centers. It is not intended to be a complete operational directive.

It is possible that certain advances in technology or changes in governmental regulations will precede these revisions. All NENA documents are subject to change as technology or other influencing factors change. Therefore, this NENA document should not be the only source of information used. NENA recommends that readers contact their 9-1-1 System Service Provider (9-1-1 SSP) representative to ensure compatibility with the 9-1-1 network, and their legal counsel to ensure compliance with current regulations.

Patents may cover the specifications, techniques, or network interface/system characteristics disclosed herein. No license expressed or implied is hereby granted. This document shall not be construed as a suggestion to any manufacturer to modify or change any of its products, nor does this document represent any commitment by NENA or any affiliate thereof to purchase any product whether or not it provides the described characteristics.

By using this document, the user agrees that NENA will have no liability for any consequential, incidental, special, or punitive damages arising from use of the document.

NENA's Committees have developed this document. Recommendations for change to this document may be submitted to:

National Emergency Number Association
1700 Diagonal Rd, Suite 500
Alexandria, VA 22314
202.466.4911
or commleadership@nena.org

NENA: The 9-1-1 Association improves 9-1-1 through research, standards development, training, education, outreach, and advocacy. Our vision is a public made safer and more secure through universally available, state-of-the-art 9-1-1 systems and better-trained 9-1-1 professionals. Learn more at nena.org.

Intellectual Property Rights (IPR) Policy

NOTE – The user's attention is called to the possibility that compliance with this document may require use of an invention covered by patent rights. By publication of this document, NENA takes no position with respect to the validity of any such claim(s) or of any patent rights in connection therewith. If a patent holder has filed a statement of willingness to grant a license under these rights on reasonable and nondiscriminatory terms and conditions to applicants desiring to obtain such a license, then details may be obtained from NENA by contacting the Committee Resource Manager identified on NENA's website at www.nena.org/ipr.

Consistent with the NENA IPR Policy, available at www.nena.org/ipr, NENA invites any interested party to bring to its attention any copyrights, patents or patent applications, or other proprietary rights that may cover technology that may be required to implement any standards referenced by this document or to implement or follow any recommended best practices, procedures or architectures contained herein.

Please address the information to:

National Emergency Number Association
1700 Diagonal Rd, Suite 500
Alexandria, VA 22314
202.466.4911
or commleadership@nena.org

Reason for Issue/Reissue

NENA reserves the right to modify this document. Upon revision, the reason(s) will be provided in the table below.

Document Number	Approval Date	Reason For Issue/Reissue
NENA-INF-023.1-2017	11/02/2017	Initial Document
NENA-INF-023.1.1-2020	02/25/2020	Non-substantive edits made.

2 Calling Source Affecting Operations

Because each PSAP has different resources and abilities, defining a threshold at which a call source is adversely affecting operations are typically determined locally. However, if PSAPs have regionalized or are in a call overflow status then multiple PSAPs may be affected. This section has been developed to provide factors which should be considered when creating policies and procedures regarding call blocking.

2.1 Defining Adversely Affecting Operations

It is important for PSAPs to consider daily fluctuations in call volume in relation to a calling source that is affecting the PSAPs ability to receive calls. A pattern of calls from a single source, by number, pANI, location, or provider which impacts the ability to receive and process calls will need to be identified before determining if a calling source should be blocked.

2.2 Service Level Monitoring

The Next Generation 9-1-1 Core Services Administrator (NGCS Administrator) should have the capability to set predetermined and agreed upon thresholds for calling source trends and a procedure regarding who, when and how to notify and alert a PSAP that a single calling source has reached or exceeded thresholds. STA-010.2-2016 outlines NENA-Call Suspicion and Bad Actor requests.

2.3 PSAP Real-Time Monitoring

NGCS should have monitoring and notification processes to PSAPs identify and alert supervisory staff regarding calling source trends in order to validate an adverse call sequence. This may be accomplished with a rule in the logger analytics that sends an alert when any one calling source exceeds a preset threshold (e.g., a percent of capacity during a time interval or a number of calls per unit of time).

In addition to monitoring, Telecommunicator feedback may provide indications of an event requiring additional investigation.

When a series of calls are received that appear to be part of a deliberate attack on the system, and a source of these calls identified, possibly with the "Call Suspicion" mechanism, a "bad actor" notification should be sent to the NGCS Administrator or appropriate designee for action. (See Section 5.1.2, NENA STA-010.2-2016)

3 Calling Sources

Technologically advanced communication devices have the ability to make multiple concurrent calls which has the potential to overwhelm a PSAP's ability to answer incoming emergency calls. These devices provide enhanced abilities however they also increase the risk of corruption or corrupted data causing repeated calls to 9-1-1 as well as malicious

intent from individuals or groups. Of concern is the ability for hackers to take control of a calling device and/or system.

3.1 Auto Dialers

While PSAPs have the ability to force disconnect calls, the potential of a computer-based caller to continuously call after disconnect should result in the calling source being identified and blocked, to any PSAP until the situation has been resolved. Auto-Dialers, whether intentionally or unintentionally, may cause multiple and repeated calls to 9-1-1.

3.2 Devices and Sensors

As intelligent devices and sensors with the design capability and granted permissions to notify a PSAP directly are deployed, the potential for those to adversely affect operations increases. For example, an intelligent device designed to only contact a PSAP if several criteria are met to reduce the potential of false calls may become corrupted or malfunction causing the device or sensor to continually contact a PSAP and should be blocked until the issue is resolved. When granting permission for a device or sensor to directly contact a PSAP repeat notification limits should be specified and tested.

While devices and sensors may be granted permission to notify PSAP(s) directly; only through a direct IP connection will it then be possible to isolate this traffic from normal voice lines and facilitate managing the operational impact of systems generating a TDoS environment.

3.3 Computer Based Denial of Service Attacks

As PSAPs become increasingly interconnected, the ability for Denial of Service attacks or repeated attempts from computer-based devices with malicious intent may become more prevalent.

3.4 Attachments

In an NG9-1-1 environment, data, pictures, video, and other media may be transmitted or associated with the call and may contain malicious content. Sources that present malicious content may be subject to blocking. The NGCS will need to validate attachments for malicious content.

4 Policy Recommendations

PSAPs should develop policies to ensure that call blocking is only used to maintain the operational integrity of the PSAP. It is highly recommended that PSAPs have policies which address nuisance callers that may require law enforcement, fire, mental health, medical intervention or other emergency response. It is critical that any policy regarding Call Blocking be reviewed and approved by the legal counsel of the Authority Having

Jurisdiction to minimize PSAP liability as a result of inappropriately blocking a calling source.

Authority Having Jurisdiction should strive to establish ordinances that require auto dialers, devices, sensors, and other communications modes that are permitted to interact directly with 9-1-1 to be registered with a responsible, identifiable and traceable party that provides a contact number to enable the PSAP to notify a responsible party to correct a situation prior to initiating call blocking.

Where the NGCS Administrator will do call blocking on request in at least some circumstances, PSAPs, the Authority Having Jurisdiction, and the NGCS Administrator should develop policies and procedures to ensure that call blocking is only used to maintain the operational integrity of the PSAP. To the extent permitted by law, it is highly recommended that systems have policies such as:

1. It is the policy of this agency to block calling sources that are preventing or have the potential to prevent the PSAP from receiving expected legitimate emergency calls. It is the policy of this agency to block calling sources which are impeding the PSAP from answering and processing legitimate emergency calls.
2. It is the policy of this agency to attempt to verify the TN of a suspected TDoS is the exact TN of the device initiating the TDoS call events.
3. It is the policy of this agency to activate call blocking on a caller/device which impacts the ingress call processing by 25% or more for an initial time of 30 minutes. After reassessment the blocking may increase to 1 hour, 12 hours, 24 hours and one week.
4. It is the policy of this agency to investigate to determine the possibility of correcting the issue.
5. If it is determined that the issue may be corrected or resolved in a timely manner by local resources the PSAP should define issue resolution and reporting requirements.
6. It is the policy of this agency that after emergency responders confirm that a calling source maliciously affected operations that the matter be referred to the appropriate agency for legal action.

5 Procedure Requirements

PSAPs should establish and maintain procedures to address call blocking including personnel authorized to initiate the process. It should be noted that the specific facts, level of threat to PSAPs and the system provided by the NGCS or Authority Having Jurisdiction, applicable state statute on inference with 9-1-1 calls, and any applicable federal or state regulatory requirements may indicate what may be the applicable policies and procedures to be use by affected 9-1-1 stakeholders in specific circumstances and may also indicate

when call blocking may be considered, by whom, and who may request call blocking under specific conditions. It is recommended that procedures include, when appropriate, steps to be taken to resolve the event prior to call blocking. The procedures should specify the criteria and include appropriate notification within the authority.

1. The NGCS Administrator should establish and maintain a 24 x 7 contact for PSAPs to use to make notifications that a calling source has met, or is trending toward meeting, the criteria for call blocking.
2. PSAPs should maintain procedures to identify a responsible party for local calling sources.
 - a. Procedures should include methods to determine if the event can be corrected by local resources.
 - b. PSAPs should maintain procedures for referring events involving non-local sources to appropriate Authorities Having Jurisdiction.
3. PSAPs should have a procedure to document that a calling source is affecting service and the steps that must be taken to resolve the issue prior to call blocking.
- PSAPs should maintain procedures that identifies who has the authority to notify the NGCS Administrator to initiate call blocking.
4. PSAPs should maintain procedures and contact information for who has the authority to escalate events that may have an impact beyond a single PSAP.

6 Condition Resolution and Unblocking of Calling Source

1. The NGCS Administrator, in coordination with the Authority Having Jurisdiction, should have a condition resolution procedure which includes surety testing.
2. Once the NGCS Administrator is confident that the calling source is no longer a threat, the initiating agency should be notified.
3. At the direction of the initiating agency, the NGCS Administrator may unblock the calling source.

7 Impacts, Considerations, Abbreviations, Terms, and Definitions

7.1 Operations Impacts Summary

As i3 compliant NG9-1-1 deployments become reality, PSAPs may be more vulnerable to calling sources adversely affecting the PSAP's ability to operate normally, unintentionally or intentionally, by overwhelming the PSAP with calls. A few possible examples are a misconfigured auto dialer, Text Apps, the Internet of Things (IoT) devices, and continuously dialing 911 or another number into the PSAP, an intentional Denial of Service Attack designed to overwhelm the ability of a PSAP to receive calls for actual emergencies.

Incidents which have the potential to prevent a PSAP from receiving legitimate emergency calls could have dire consequences for individual citizens. With hierarchical or interconnected ESInets, such events could impact multiple PSAPs affecting greater numbers of citizens.

Within this document the term “calls” refers to any source or method to notify or contact a PSAP such as voice (legacy landline, wireless, VoIP), SMS, Text, RTT, MMS video, apps and successor technologies.

To maintain the ability to receive and process calls requiring a response from Emergency Services, PSAPs should have the ability to quickly and accurately identify a calling source adversely impacting their operation and request that it be blocked until the calling source is no longer a threat to normal operations. It is not the intent of this document to suggest that the calling source used by an occasional nuisance caller, who is not creating an undue burden on a PSAP, should be blocked.

7.2 Technical Impacts Summary

The ability to analyze calling source trends may require additional technical development of Management Information Systems.

7.3 Security Impacts Summary

Calls that are adversely affecting the PSAP’s ability to operate normally and continue receiving legitimate calls presents a security concern for PSAP operations. Overwhelming a PSAP or several PSAPs within a region could adversely affect the delivery of emergency services to the affected area. A single PSAP may experience an abrupt DoS; however, if a call overflow policy exists, then potentially multiple PSAPs could be affected. ESInet ingress elements will require the ability to both determine patterns of inbound calls to ascertain malicious intent and to take action to prevent the disruption of service to the served PSAPs. For this reason, call sources which pose this danger should be addressed swiftly. The ability of a PSAP to rapidly identify the source of such calls is a key to protecting its operations.

7.4 Recommendation for Additional Development Work

It is recommended that PSAPs and Authorities Having Jurisdiction identify any existing state statutes and local ordinances that may hinder implementing the recommendations in this document. Additional work with legislative setting authorities may be necessary to refine existing statutes to ensure the PSAPs legal capacity to block a calling source. Not all laws nationwide may be written clearly when addressing these issues. It is understood that most 9-1-1 Statutes are from the state level. Additional work is needed to address both state and federal rules to provide guidance regarding blocking calling sources.

It is recommended that continual planning be undertaken to provide guidance regarding Distributed Denial of Service (DDoS).

As lessons are learned and technology advances related to Denial of Service this document should be reviewed and updated as necessary.

7.5 Anticipated Timeline

When PSAPs begin utilizing i3 compliant Next Generation 9-1-1 Core Services (NGCS) including the BCF or advanced call monitoring policy rules they may have the ability to have calls blocked.

7.6 Cost Factors

The process to request blocking of calling sources should have no direct cost impacts on PSAPs. There may be indirect costs associated with developing operational procedures and training.

7.7 Cost Recovery Considerations

Not Applicable.

7.8 Additional Impacts (non-cost related)

The information contained in this NENA document may have non-operational impacts that should be taken into consideration. The primary impacts are expected to include:

- Adverse public opinion due to lack of information and unrealistic expectations
- Procedures associated with this document should be reviewed for any potential conflict with Federal, State laws and Local ordinances and regulations

7.9 Abbreviations, Terms, and Definitions

See NENA-ADM-000, NENA Master Glossary of 9-1-1 Terminology, located on the [NENA web site](#) for a complete listing of terms used in NENA documents. All abbreviations used in this document are listed below, along with any new or updated terms and definitions.

Term or Abbreviation (Expansion)	Definition / Description
<i>NGCS (Next Generation 9-1-1 Core Services) Administrator</i>	The entity managing the Next Generation 9-1-1 Core Services equipment and operations.

8 Recommended Reading and References

- [1] National Emergency Number Association. *Master Glossary of 9-1-1 Terminology*. [NENA-ADM-000.22-2018](#), approved April 13, 2018.
- [2] National Emergency Number Association. *NENA Detailed Functional and Interface Standards for the NENA i3 Solution*. [NENA-STA-010.2-2016 \(originally 08-003\)](#), approved September 10, 2016.
- [3] Federal Communications Center's Public Safety Support Center ([PSSC] email: publicsafety-supportcenter@fcc.gov // phone: (877) 480-3201 M-F 8A-6P ET or (202) 418-1122 for emergencies <https://www.fcc.gov/general/public-safety-support-center>).

Exhibit A: Immediate Considerations -- Calling Source Impacting Operations

- Are operations being affected?
- Are calls being received and processed appropriately?
- Is there a need for additional staff?
- Did the information come from the NOC or Telecommunicators?
 - If from Telecommunicators, contact the NOC (XXX-XXX-XXXX) PSAP ID (XXXX) request they provide calling source and location.
 - If from the NOC, request they provide calling source and location.
- Attempt to verify the source TN originating the traffic.

Is the source TN the exact TN originating the TDoS traffic?

- Is the location of the calling source in jurisdiction?
 - If yes, ensure responders dispatched and contact responsible party to resolve issue.
 - If no, contact local PSAP and request they dispatch and contact responsible party for resolution. Recontact in ten minutes for update.
- If the issue cannot be resolved through the responsible party, contact NOC (XXX-XXX-XXXX) PSAP ID (XXXX) and request they block calling source.
- Notifications: Dep. Dir. 911, Dep Dir. 911 OPS, Dep Dir. 911 Tech, On call ADA.

ACKNOWLEDGEMENTS

The National Emergency Number Association (NENA) PSAP Operations Committee, Call Blocking Working Group developed this document.

NENA recognizes the following industry experts and their employers for their contributions in development of this document.

Executive Board Approval Date 11/02/2017

Members	Employer
Wendi Lively, ENP, PSAP Operations Committee Co-Chair	Spartanburg County, SC
April Heinze, ENP, PSAP Operations Committee Co-Chair	INdigital Telecom
Marc Berryman, ENP, Working Group Co-Chair	Mission Critical Partners
John Haynes, ENP, Working Group Co-Chair	Chester County, PA
Lisa Dodson, ENP	TriTech Software Systems
Pete Eggimann, ENP	Metropolitan Emergency Services Board MN
Kenton Kurland, ENP	Cobb County, GA
Roger Hixon, ENP	NENA

Special Acknowledgements:

Delaine Arnold, ENP, Committee Resource Manager, has facilitated the production of this document through the prescribed approval process.

The Call Blocking Working Group is part of the NENA Development Group that is led by:

- Pete Eggimann, ENP, and Jim Shepard, ENP, Development Steering Council Co-Chairs
- Brandon Abley, ENP, Technical Issues Director
- April Heinze, ENP, 9-1-1 and PSAP Operations Director