ShakeAlert® Joint Committee for Communication, Education, and Outreach (JCCEO)
"Supporting the ShakeAlert® System through coordination, collaboration, and community building."
California – Oregon – Washington
Technical Engagement Program

ShakeAlert® Technical Performance Review Criteria for License to Operate Conversion

The goal for the ShakeAlert pilot phase is for technical partners to be granted License to Operate (LtO) status for a given product, process, application, etc. as described in Appendix A of a Pilot License Agreement (PLA). Before an LtO can be granted by the USGS, all candidates must develop a written plan that addresses (1) technical and (2) education and training elements and present this plan to the USGS.

This document focuses on technical criteria only. Every system (i.e. proposed use of ShakeAlert Messages) is unique and additional elements may be needed if the product, service, etc. has special features not addressed by this outline. This is a suggested template and if another format is used the elements listed here should still be addressed. For questions regarding the components of the technical review criteria please reach out to Robert de Groot, ShakeAlert Coordinator for Technical Engagement at: rdegroot@usgs.gov.

1. Introduction
    a. System purpose
    b. System description and architecture
    c. Scope of expected uses
    d. Geographic area to be served
    e. Maximum number of clients to be supported
    f. Level of service to be provided (e.g. life safety, guaranteed deliver, best effort)
    g. Level of availability to be provided (e.g. 3-nines, 4-nines, etc.)
2. General Test Approach
3. Test Elements
    a. System Service Level
        i. Redundancy: Demonstration of system redundancy and automatic failover
            1. Tests performed
            2. Test results
        ii. State of Health Monitoring: Automatic monitoring of system health and status
            1. Tests performed
            2. Test results

iii. Operator Notification and Response: Automatic notification of operators and operator response
    1. Tests performed
    2. Test results
iv. Connection Management & Recovery: Server detection and recovery after loss of connection to USGS Alert Servers
    1. Tests performed
    2. Test results

b. Change Management: Describe what tests are done when changes are made to your system
c. Alert Delivery Thresholds: Demonstrate that ShakeAlert magnitude and intensity thresholds are implemented in your system (Current Thresholds)
    1. Tests performed
    2. Test results
d. Area Management: Demonstrate that alerts occur only within your intended service area
    1. Tests performed
    2. Test results
e. Message handling:
    i. Stress Test: ShakeAlert updates may be published at a rate of up to two messages per second. Demonstrate that your system can process the maximum expected message volume.
        1. Tests performed
        2. Test results
    ii. ShakeAlert Message Updates: Demonstrate that your system can handle ShakeAlert Message updates. Note that updates may contain significant changes to important values like location, magnitude, or ground motion estimates.
        1. Tests performed
        2. Test results
    iii. Follow-up Messages: Demonstrate that your system can handle follow-up messages. (Especially: notice of false alerts)
        1. Tests performed
        2. Test results
    iv. Discrepancies: If your system subscribes to multiple USGS ShakeAlert servers simultaneously, demonstrate that your system can handle differences in the messages received.
        1. Tests performed
        2. Test results
f. Latency and Performance Measurement
    i. Measuring Latency: Describe how your system measures the time between receipt of a ShakeAlert Message when your system takes action or delivers an alert to users. (See Appendix B, ShakeAlert Performance Reporting)

1. Tests performed
2. Test results

ii. System scalability (Volume): Demonstrate that your system can meet ShakeAlert latency benchmarks when it reaches the maximum number of clients to be supported.
    1. Tests performed
    2. Test results

g. Security: Describe how overall system security will be maintained in your system, including:
    i. Server room physical security (if not a cloud service)
    ii. Server security update and patching plan
    iii. Intrusion detection
    iv. Protection of USGS Alert Server credentials
    v. Security of the communications channels for your server(s) to endpoints (clients or devices)

Appendix A: Performance Benchmark

Excerpt from ShakeAlert Pilot Agreement

5. Benchmarks

5.1. Measuring Delays.

The Licensee shall provide a copy of an annual report including a summary of compliance with benchmarks, quantity of subscribers, elapsed time from when a ShakeAlert Message is received from USGS and when it is delivered to Licensee's end users (e.g., commercial subscribers or clients) with a precision of one (1) second or better. The Licensee shall provide this performance data to USGS within seven (7) days of a request. USGS is free to provide this data to the public, unless stated in Appendix D.

5.2. Alert Delays.

The Licensee shall make reasonable effort to ensure the fastest possible delivery time of an alert. Licensee shall maintain an average time to receive, process, and redistribute the alerts from the ShakeAlert system to its clients at no more than five (5) seconds, for at least 95 percent of users.

Appendix B: ShakeAlert Performance Reporting aligned with ShakeAlert Thresholds

- For M4.0+ events the Licensee will report
    - Total number of devices alerted/activated (USGS can share this publicly)

    - Any unexpected behavior observed?

- For M4.5+ events the Licensee will report
    - Total number of phones alerted (USGS can share this publicly)
    - Any unexpected behavior observed?

- For M5.0+ events, alerts to more than 10k end users, or at USGS request in special cases the Licensee will report
    - Time ShakeAlert Messages were received by the Licensee from USGS ShakeAlert servers
    - Time alerts were received by devices in 1 second bins and further broken down by now they were connected, WiFi or cellular
    - Any unexpected behavior observed?
- Special circumstances may warrant additional exchange of information.
- The Licensee will provide reports within 7 days of an event or request