

# TECHNICAL PERFORMANCE GUIDELINES 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, service, 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 report that addresses (1) technical elements and (2) education and training elements, and must present their plan to the USGS via a Performance Review.

This document focuses on technical criteria only. Every ShakeAlert-powered product or service is unique, and additional technical criteria may be needed if the product, service, etc. has special features not addressed by this outline. Below is a suggested template; if another format is used, the elements listed here should still be addressed.

**For questions regarding the components of the technical review criteria, please contact Robert de Groot, ShakeAlert Coordinator for Technical Engagement, at [rdegroot@usgs.gov](mailto:rdegroot@usgs.gov).**

## 1) Introduction

- a) Purpose of ShakeAlert-powered product or service
- b) Description and architecture of product or service
- 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 delivery, best effort, etc.)
- g) Level of availability to be provided (e.g., 3-nines, 4-nines, etc.)

## 2) General Test Approach

## 3) Test Elements

- a) ShakeAlert-Powered Product or Service Level
  - i) *Redundancy*: Demonstration of redundancy and automatic failover
    - (1) Tests performed
    - (2) Test results
  - ii) *State of Health Monitoring*: Automatic monitoring of 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 ShakeAlert Message (Alert) Servers
    - (1) Tests performed
    - (2) Test results
- b) Change Management: Describe what tests are done when changes are made to your product or service.
- c) Alert Delivery Thresholds: Demonstrate that USGS-mandated ShakeAlert magnitude and intensity thresholds are implemented in your product or service (See [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 Message updates may be published at a rate of up to two (2) 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 product or service can handle ShakeAlert Message updates. Note that updates may contain significant changes to important values, such as location, magnitude, or ground motion estimates.
    - (1) Tests performed
    - (2) Test results
  - iii) *Post ShakeAlert Message 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 operated ShakeAlert Message (Alert) Servers simultaneously, demonstrate that your system can handle any 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 end-users. (See [Appendix B, ShakeAlert Performance Reporting.](#))
    - (1) Tests performed
    - (2) Test results
  - ii) *System Scalability (Volume)*: Demonstrate that your product or service can meet ShakeAlert latency benchmarks when it reaches the maximum number of end-users (and/or clients) to be supported.
    - (1) Tests performed
    - (2) Test results
- g) Security: Describe how overall security will be maintained for licensee product or service, 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 ShakeAlert Message (Alert) Server credentials
  - v) Security of the communications channels for licensee server(s) to endpoints (clients or devices)

## APPENDIX A: PERFORMANCE BENCHMARKS

### Excerpted from ShakeAlert Pilot License Agreement (August 2022)

#### 5. Benchmarks

1. Alerting Speed. Licensee must make reasonable efforts to ensure the fastest possible delivery time of ShakeAlert-powered alerts to end-users. Licensee must strive to maintain an average time to receive and process ShakeAlert Messages from the ShakeAlert system and deliver alerts to its clients of no more than five (5) seconds, for at least ninety-five (95) percent of end-users.
2. Recordkeeping. Licensee must record and retain performance information sufficient to meet its obligations under Section 6. Reporting.

## 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 Message (Alert) Servers
  - Time alerts were received by devices in one (1) second bins and further broken down by how they were connected (WiFi or cellular)
  - Any unexpected behavior observed
- Special circumstances may warrant additional exchange of information.
- The Licensee will provide reports within seven (7) days of an event or request.