

FAQ: How to Become a ShakeAlert® Technical Partner

The **ShakeAlert® Earthquake Early Warning (EEW) system**¹, operated by the U.S. Geological Survey (USGS), quickly detects significant earthquakes, estimates shaking, and issues ShakeAlert Messages to Technical Partners. Then, Technical Partners, which have entered into a license agreement with the USGS, use this information to deliver alerts that rapidly reach people and trigger automated actions to protect vital systems and infrastructure, potentially seconds before shaking arrives at their location.

• What is a ShakeAlert Technical Partner?

A ShakeAlert Technical Partner is any entity that enters into a license agreement with the USGS to use USGS-issued ShakeAlert Messages for alerting applications, such as warning people to take a protective action or triggering an automated action to protect critical systems.

Technical Partners span multiple industries and sectors, and include private for-profit companies, public entities, and nonprofits that can demonstrate a benefit from becoming part of the ShakeAlert System.

While Technical Partners provide mechanisms or services for alert delivery, ShakeAlert also offers formal agreements for others who are exploring what it would take to become a Technical Partner (i.e., Evaluation Partners) or who are working with the USGS to develop education and training resources (i.e., Communication, Education, and Outreach [CEO] Partners). Evaluation Partners and CEO Partners do not issue alerts to end-users.

¹ When referring to “system” vs “System,” lowercase “s” refers to the USGS part of the operation (sensors and processing centers), and uppercase “S” refers to the USGS part and the alert delivery Technical Partners (i.e., the entire System).

ShakeAlert Partnerships

TECHNICAL PARTNERS

Pilot Partners develop and internally test innovative ways to use ShakeAlert data to deliver alerts that prompt people and systems to take protective action.

License to Operate (LtO) Partners have met USGS-mandated standards for speed, reliability, and technical performance, including providing appropriate education and training for their end-users. LtO Partners are approved to provide or sell their developed product to end-users.

OTHER PARTNERS

Evaluation Partners are “observe-only” partners who have access to the ShakeAlert System data feed, but cannot take action or develop products based on this ShakeAlert information. An Evaluation Partnership provides an opportunity to learn more about how the ShakeAlert System works and the products it produces, so entities can evaluate if they want to become a Pilot Partner or an end-user.

Communication, Education, and Outreach (CEO) Partners are not pursuing a technical implementation of ShakeAlert; rather, they partner with the USGS on the development of education and/or training resources for ShakeAlert.

End-users

End-users receive ShakeAlert-powered products or services from LtO Partners. End-users include people who receive these products or services directly (e.g., to their cell phones), as well as organizations that work with an LtO Partner to implement automated “machine-to-machine” actions.

Note: End-users can also receive Wireless Emergency Alerts (WEA) to their mobile devices. WEA is a partnership among the Federal Emergency Management Agency (FEMA), the Federal Communications Commission (FCC), and wireless providers.

• What is the goal of a Technical Partner?

A Technical Partner's goal is to deliver ShakeAlert-powered alerts and/or to trigger automated actions based on shaking estimates that are published by the ShakeAlert system (i.e., ShakeAlert Messages) when certain magnitude and intensity thresholds are met. The types of automated actions these alerts can trigger vary by industry and environment but can include closing valves and stopping heavy rotating equipment, issuing public announcements, displaying digital messages along roadways and on/inside buildings, controlling generators, and slowing trains, for example.

Following a Pilot Partnership phase, a Technical Partner can become a ShakeAlert License to Operate (LtO) Partner by meeting USGS-mandated standards for speed, reliability, and technical performance. LtO Partners may provide or sell their developed product to end-users who are interested in earthquake mitigation through earthquake early warning automation.

The flow chart below depicts the roles of both the USGS and Technical Partners in the ShakeAlert System. More information can be found in the ShakeAlert Start-up Guide: <https://tinyurl.com/ShakeAlert-Start-Up-Guide>.

Does my organization need to become a Technical Partner to implement ShakeAlert?

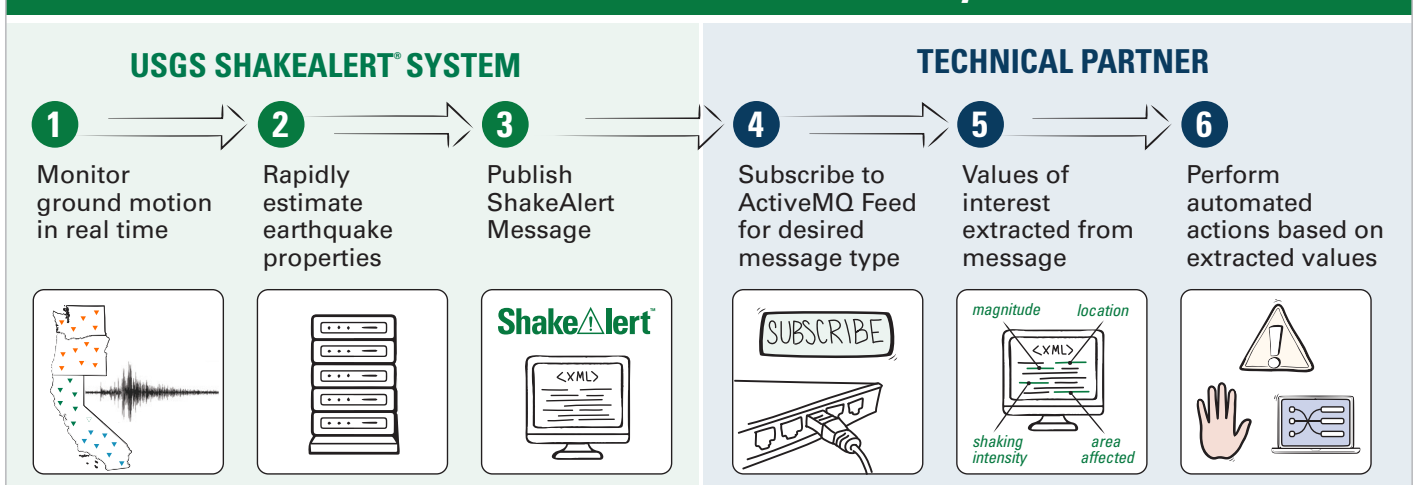
Not necessarily. There are two paths for organizations interested in using earthquake early warning to alert people and/or trigger automated actions to protect systems and infrastructure.

- 1. Become a Technical Partner and develop your own in-house ShakeAlert application, or**
- 2. Become an end-user of an existing License to Operate (LtO) Partner. Procure and implement their product. To learn more about the services current LtO Partners provide, visit ShakeAlert.org/implementation/LtO**

• Why are Technical Partners an important component of Earthquake Early Warning?

Technical Partners are integral to the success of ShakeAlert. By building systems that deliver alerts and automate actions, Technical Partners help to save lives, minimize injuries, and reduce earthquake damage to property and infrastructure. They can play a critical role in mitigating immediate earthquake losses, subsequent indirect earthquake economic impacts, and possible ripple effects, or "secondary disasters." These mitigation efforts can increase a community's recovery and speed return to normal status. Automation of alerts to the general public and to infrastructure systems is critical to improve earthquake resilience.

Who does what in the ShakeAlert® System?



The Alert Thresholds infographic below identifies the USGS alerting thresholds. LtO Technical Partners can choose to set their own alerting thresholds higher than this USGS minimum; for example, they may set their alerting thresholds higher if their end-users prefer not to receive alerts for weak shaking.

Alert Thresholds

To Alert People



Wireless Emergency Alert (WEA)

Who is Alerted

General public with WEA-capable devices

Magnitude Threshold
5.0+

Intensity Threshold

MMI IV+



Cell Phone Apps

People who have downloaded a cell phone app

Magnitude Threshold
4.5+

MMI III+
(user selectable)



Android Operating System

Android cell phone users through push notifications

Magnitude Threshold
4.5+

MMI III -
MMI IV

Android cell phone users through full-screen takeover

Magnitude Threshold
4.5+

MMI V+



Automated Alerts through Public Address Systems, Lights, Sirens, In-House Apps, etc.

Institutions that use ShakeAlert to alert people to take a protective action

Magnitude Threshold
4.0+

MMI III+

To Alert Systems and Machines



Automated "Machine-to-Machine" Alerts

Institutions that use ShakeAlert to automate actions to mitigate damage to vital equipment, systems, and infrastructure

Magnitude Threshold
4.0+

MMI III+

ShakeAlert

As of June 2021

Examples of Automated Actions Powered by ShakeAlert®

Alerts Delivered to People



On Your Mobile Device



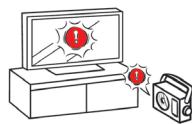
Electronic Road Signage



Digital Billboard on Buildings



Public Announcements



Emergency Alerts over TV and Radio

"Machine-to-Machine" Actions



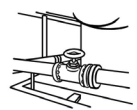
Slowing Trains



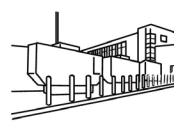
Recalling Elevators



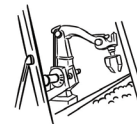
Opening Firehouse Doors



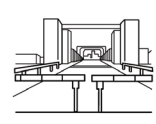
Shutting Off Water and Gas Valves



Activating Generators



Parking Delicate Machinery



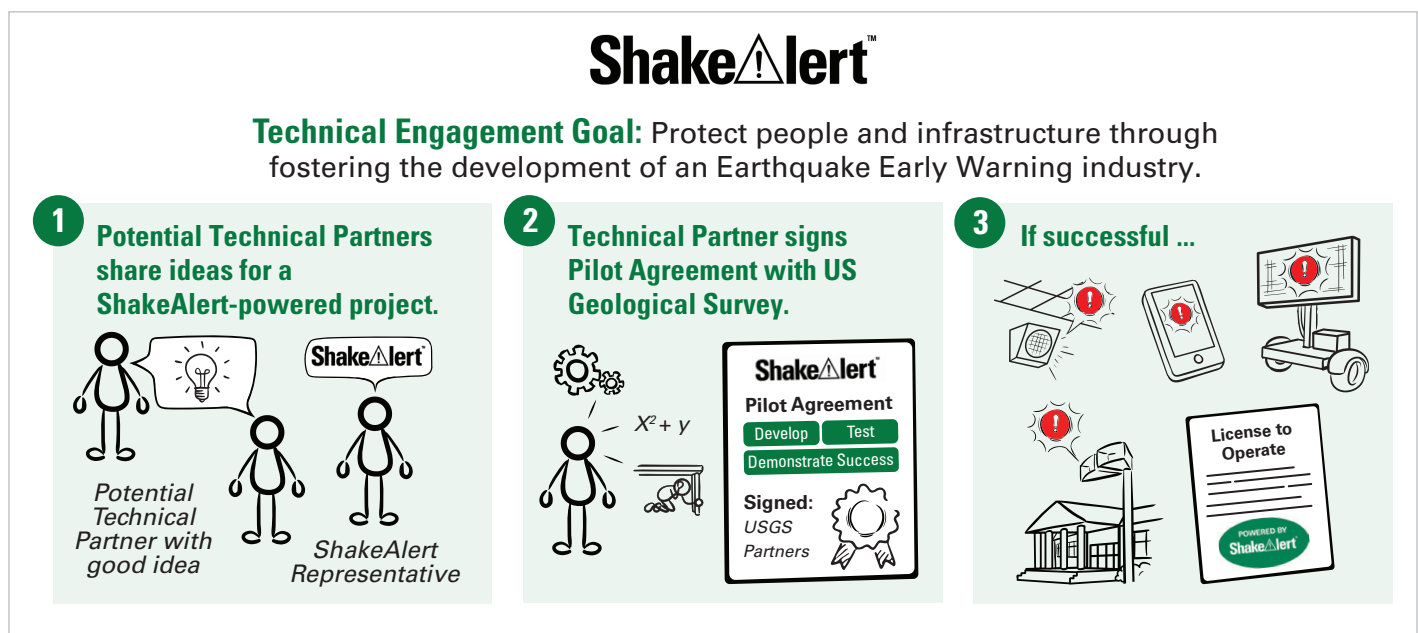
Closing Bridge Gates

• How can I become a ShakeAlert Technical Partner?

The first step to becoming a Technical Partner is to talk with your ShakeAlert Regional Coordinator (see the end of this document). They will help you form a clear vision of how you will develop an internal pilot project that demonstrates the use of ShakeAlert data to trigger real-world automations. The next step is to work with your Regional Coordinator to develop your project statement of work (SOW). Once the application and SOW are ready, the prospective Technical Partner will work directly with the USGS to execute a ShakeAlert Pilot License Agreement.

The goal of a ShakeAlert Pilot Partnership is to develop, test, and vet automated integrations of the USGS-issued ShakeAlert Message into critical operations or communications and ultimately, to convert to License to Operate (LtO) status for your product, process, application, or service. An LtO Agreement approves you as a Technical Partner to market your product, process, application, or service; grants continued access to ShakeAlert resources (e.g., ShakeAlert Messages); and formalizes terms and conditions with the USGS.

The USGS will grant you an LtO Technical Partner status after you have developed a written plan that (1) addresses delivery capacity; (2) follows education and training recommendations; and (3) demonstrates that your delivery and/or automated control solutions meet USGS ShakeAlert technical performance standards.



• What criteria must a Technical Partner meet to achieve LtO status?

The ShakeAlert Technical Performance Review Criteria (tinyurl.com/ShakeAlert-Tech-Guidelines) for LtO Conversion provides Technical Partners with the criteria required for converting from a Pilot Partner to an LtO Technical Partner, including:

1. Alerts and automated actions must be fast enough to be effective.

Latency and performance measurements and benchmarks must be demonstrated; LtO Technical Partners must receive, process, and distribute alerts to end-users in no more than five (5) seconds for at least 95 percent of end-users.

2. Redundancies, automatic failover, and monitoring must be demonstrated for system reliability.

For LtO conversion, Technical Partners must: demonstrate an ability to detect and recover USGS server connectivity; demonstrate failover and redundancy capabilities; maintain system security; demonstrate state-of-health monitoring; and other criteria outlined in the ShakeAlert Technical Performance Review Criteria.

3. ShakeAlert Message handling criteria must be met.

Technical Partners conduct stress tests and demonstrate that their system can process the maximum expected Message volume and handle automated ShakeAlert Message updates and follow-up Messages.

• What are the education and training requirements for LtO Technical Partners?

An important component of a Technical Partner's pilot project is their Education and Training Plan, which informs end-users about their product and/or what action to take when an alert is received. Recommended components of the Education and Training Plan: include a description and/or example of materials that contain ShakeAlert-recommended messaging; the intended delivery method to alert ShakeAlert end-users; and a description of how the Technical Partner will be available to end-users for questions or other inquiries related to education and training. Please refer to the Technical Partner Resource Center (ShakeAlert.org/technical-partner-resources/TPRC/) for more detailed information or contact a Regional Coordinator listed at the end of this document.

• What are the benefits of the licensing agreement with the USGS?

It ensures confidentiality.

The License Agreement includes a strong confidentiality clause to better protect Technical Partners. Note that not everything is legally considered confidential.

It provides clarity regarding subcontractors.

The licensing agreement clarifies and simplifies subcontractor involvement.

It details USGS technical and other support provided.

Specific terms regarding the USGS role in providing technical support and notifications are identified. Messaging Toolkits and associated resources geared to help LtO Technical Partners meet their Education and Training Plan requirements are also provided, as well as ShakeAlert brand and trademark use guidance.



• Who should be contacted for more information?

Technical Engagement Coordinator

U.S. Geological Survey

Robert de Groot, PhD – rdegroot@usgs.gov

Technical Partnership Regional Coordinator Contacts

Washington

William Steele (lead) – wsteele@uw.edu

Gabriel Lotto, PhD – glotto@uw.edu

Oregon

Kelly Missett (lead) – kmissett@uoregon.edu

Gabriel Lotto, PhD – glotto@uw.edu

California

Tal Edgecomb (Northern California) – tale@berkeley.edu

Margaret Vinci (Southern California lead) – vinci@caltech.edu

REFERENCES AND RESOURCES

Become a ShakeAlert System Partner- US Geological Survey (USGS) ShakeAlert
<https://www.shakealert.org/implementation/partners/>

Berkeley Seismology Lab- UC Berkeley
<https://seismo.berkeley.edu/>

ShakeAlert Education and Training Materials for Formal and Informal Learning Settings- Incorporated
Research Institutions for Seismology (IRIS)
https://www.iris.edu/hq/programs/epo/shake_alert

ShakeAlert Technical Partner Resource Center- US Geological Survey (USGS) ShakeAlert
<https://www.shakealert.org/education-outreach/tprc/>

ShakeAlert® Technical Performance Review Criteria for License to Operate Conversion- ShakeAlert®
Joint Committee for Communication, Education, and Outreach (JCCEO)
<https://tinyurl.com/ShakeAlert-Tech-Guidelines>

What is ShakeAlert and How Does it Work?- Pacific Northwest Seismic Network (PNSN)
<https://www.pnsn.org/pnsn-data-products/earthquake-early-warning>

Recommendations for Developing ShakeAlert® Technical Education and Training Plan(s) for License to
Operate Conversion from Pilot License Agreement
<https://tinyurl.com/Education-Training-Guidelines>