Quake Catcher Network – QCN EPIcenter Team
Program Fact Sheet – 2022
Program URL: quakecatcher.net
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Background

The Quake Catcher Network (QCN) is a collaborative initiative for developing the world's largest, low-cost strong-motion seismic network by utilizing motion sensors in and attached to internet-connected computers. QCN is managed by representatives from Incorporated Research Institutions for Seismology (IRIS), the Southern California Earthquake Center (SCEC), the US Geological Survey Earthquake Science Center, and the Central U.S. Earthquake Consortium (CUSEC)

QCN links volunteer hosted computers into a real-time motion-sensing network. The volunteer computers monitor vibrational sensors called micro electro-mechanical systems (MEMS) accelerometers and digitally transmit "triggers" to QCN's servers whenever strong motions are observed. QCN's servers sift through these signals, and determine which ones represent earthquakes, and which ones represent cultural noise.

QCN will provide your institution with a MEMS accelerometer and a QCN technician will install the sensor and the required compatible software.

Many participants use their QCN enabled computer for other purposes. QCN does not affect computer performance, use a large amount of memory, or use significant hard disk space. None of the users have reported a difference in performance. At any given time QCN uses about 1% of your processor capacity. The Berkeley Open Infrastructure for Network Computing (BOINC) software and QCN sensor driver software will occupy only about 10 MB of disk space.

BOINC is an open source middleware system for volunteer and grid computing. It was originally developed to support the SETI@home project before it became useful as a platform for other distributed applications in areas as diverse as mathematics, medicine, molecular biology, climatology, geophysics, and astrophysics. The intent of BOINC is to make it possible for researchers to tap into the enormous processing power of personal computers around the world.

If you have a metered data Internet plan (e.g. if you have 5 GB per month), QCN will not impact your data use in any significant way. QCN data is made up of text files which are not data intensive. Under normal circumstances QCN might use 25 MB of your data allotment per month. If you have a 5 GB allotment per month, this amounts to 0.5% of your data allotment.

Requirements

To successfully complete the installation:

1) A computer (either PC or Apple) which is either located in or can be relocated to a room with as little traffic and disturbance as possible. An ideal spot for this would be either in a basement, a library-type room, or even a very quiet office. This computer should have an available USB port for the sensor to connect to, and should be running and connected to the Internet at all times.

2) An IT administrator at your site who can assist with (a) installation of the BOINC software, (b) installation of the driver for the sensor, and (c) set any permissions which will allow that computer to send seismic data to the QCN server at Caltech. The BOINC software, or the program which uploads the MEMS accelerometer data to the servers, must be able to access the Internet at all times. Because of this, we will require someone on-hand who will be able to troubleshoot any internet-related issues we may encounter.

PC

Operating system

- Windows 2000 SP5 or XP, SP2, or later. However, we've had major issues installing QCN on PCs running Vista.

Hardware

- Pentium 233 MHz (Recommended: Pentium 500 MHz or greater)
- 64 MB RAM (Recommended: 128 MB RAM or greater)
- 200 MB disk space (maximum)

Permissions

- You must have administrator privileges to install BOINC and the driver.

Nvidia Support

- Must have driver version 185.85 or better installed in order to use your GPU.

ATI Support

- You must have driver version 8.12 or better installed in order to use your GPU.

Apple

Operating system

- Mac OS X 10.6.0 and later (The sensor driver requires this version of Mac OS, not BOINC)

Hardware

- Apple computer with an Intel x86 or PowerPC G3, G4, G5, or later processor.
- 28 MB RAM (Recommended: 256 MB RAM or greater)
- 200 MB hard disk space (the BOINC software and sensor driver take up 2.6 MB of hard disk space).

Program Managers:

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Pre Installation Information

(1) Computer: We request that the machine with the sensor is not turned off because when it is off you are not catching quakes! Turning off the monitor is okay; we just need the CPU running. An issue we have encountered with K-12 schools is that many districts shut down all machines remotely from the late evening to the early morning.

(2) Installation Site IT Support: We will need to consult with the person in charge of IT in at your site or someone who can act on behalf of that person. We need administrative access to the machine(s) that will be running QCN because we need to install the BOINC software and the driver for the sensor. Once this step is completed we do not require any special access to the computer or your network. All of the data collected is sent over the Internet (Port 80) as text files. Ideally we should install QCN as a service rather than as an application. In the latter case data collection will only be occurring when a user is signed into the computer. This can get complicated because someone will have to be signed in 24/7. If it is a service it will run all the time while the computer is turned on. Also the preference is to install on desktop computers not laptops.

Important: To make BOINC (and the driver) available in a "service" capacity might require some other arrangements with your network administrator. Making those plans in advance of the installation is advised. Please at least check with your IT administrator that installing BOINC as a service is permitted.

(3) QCN Tutorial: Part of the installation process involves setting up a profile on the QCN website where you will join the QCN EPIcenter "Team." The QCN technician will also show you how to navigate the QCN website and how to get data from your sensor if it is triggered.

(4) Sensor: Currently, there is no cost for the sensor (retail price is $100). Very little upkeep is needed. We will be taping the sensor to the floor - we don't do any drilling, digging, etc. As long as the sensor is not disturbed it will be fine. If there is a flood or other major disturbance (e.g. the sensor is crushed, etc.) then the sensor will likely be damaged. To minimize the chances of the sensor being physically disturbed and subjected to excess ambient noise we have installed sensors in server rooms and other out of the way places. A sensor taped to the floor in a cool, low traffic space on the ground floor is the ideal but we have installed successfully in many environments.

(5) Sensor Installation: There is no cost for the installation. Accompanied by one of your IT staff members the QCN technician will conduct the installation. Installations generally take 30 minutes.

(**6) Contacts for your Institution:** We - and you - can monitor the "health" of your sensor remotely via the QCN web portal. We will work within your organizational structure but need to have a primary and secondary contact person at your institution available if we identify an issue with your sensor and/or the computer. Typically the primary contact is the person who requested the installation and the secondary is an IT person. It is totally up to you how you want to handle it – we will respect how you want to manage QCN at your site.

Representatives of the following organizations participate in QCN governance:

the IRIS CONSORTIUM

ShakeAlert™

SCEC an NSF+USGS center Southern California Earthquake Center

CENTRAL UNITED STATES EARTHQUAKE CONSORTIUM

earthscope www.earthscope.org