



## DISSEMINATION

Whenever new event information becomes available, by default, the GDS is performing the dissemination fully automatically in the background based on the rules setup by the user. In addition the GDS Web interface provides an interactive way for dissemination.

A timetable lists all current and historic earthquakes, and shows the latest dissemination time (if any). Once an earthquake is selected a list of available revisions including the hypocenter, magnitude and status information is shown.

After selecting a particular revision a list of queues and their subscriptions is presented. Only subscriptions of matching queues, which also have not received a bulletin yet, are marked for dissemination. This selection may be overruled by the user simply by toggling checkboxes.

Prior to dissemination the user may switch to the edit mode to review the content generated by the template engine.

Every bulletin type may be examined and its content may be altered. Figure 4 shows an example of an email message. The operator may change the subject, edit the message text or have a look at the image of the epicenter attached.

## LOGGING

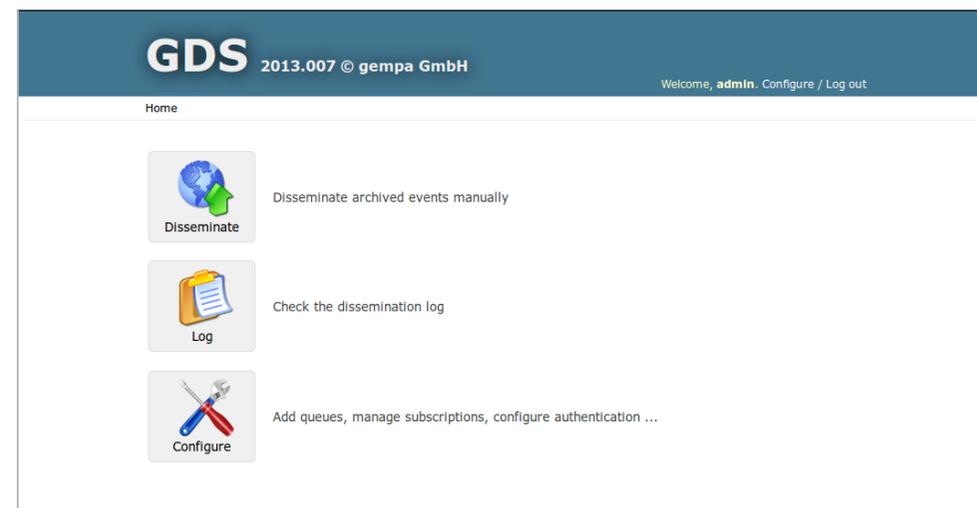
GDS logs every action performed by the system or by the user and provides all information through an easily accessible Web interface.

The configuration log shows a history of changes for each settings including time and user login.

The dissemination log (Figure 5) may be accessed by dissemination time or on event basis. It lists the triggered services and subscriptions, shows the dissemination state in different colors and even displays the content sent out.

## GDS

Dissemination and Publication Server by gempa GmbH



## WEB-BASED DISSEMINATION AND LOG REVIEW

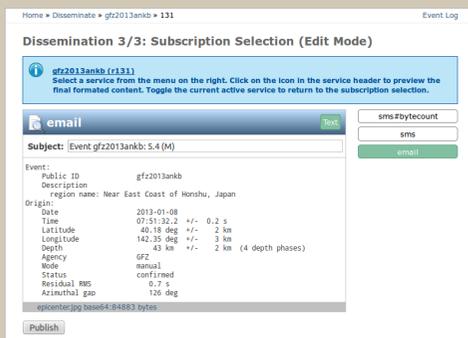


Figure 4 Dissemination, review of bulletin

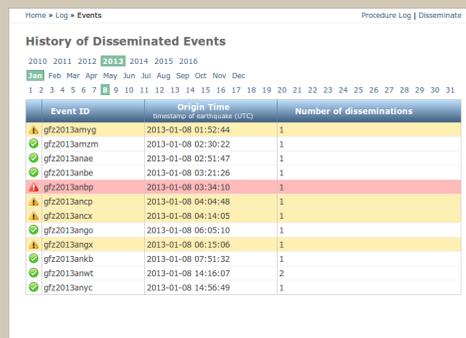


Figure 5 Event Log, color encoded state

## APPLICATION

- filtering, formatting and dissemination of earthquake information
- dissemination of arbitrary messages, e.g. Tsunami bulletins

- various communication channels such as SMS, email, fax, Web
- plug-in technology to import earthquake solutions from different sources, such as SEISCOMP3
- direct connectivity to TOAST (gempa GmbH)

## FEATURES

- Web-based user interface
- detailed filter options
- bulletin creation based on customizable templates

- detailed logging facility, including configuration changes, notified subscribers and disseminated bulletins
- fine-grained access control, different rolls and privileges
- automatic and manual dissemination
- modular, expandable

## INTRODUCTION

gempa GmbH, Potsdam (Germany), a spin-off of GFZ (German Research Center for Geosciences), presents a modular expandable dissemination and publication server. It is using a plug-in technology to import earthquake solutions from different sources, filter the incoming earthquake information and disseminate template-based messages through various communication channels such as SMS, email, fax and Web. GDS complements the functionality of SEISCOMP3 and TOAST in the domain of dissemination of notifications and warnings.

## ARCHITECTURE

The GDS consists of a set of individual modules (Figure 1) to

- acquire earthquake information
- filter dissemination queues
- generate various message formats based on templates
- automatically and interactively disseminate bulletins through various communication channels

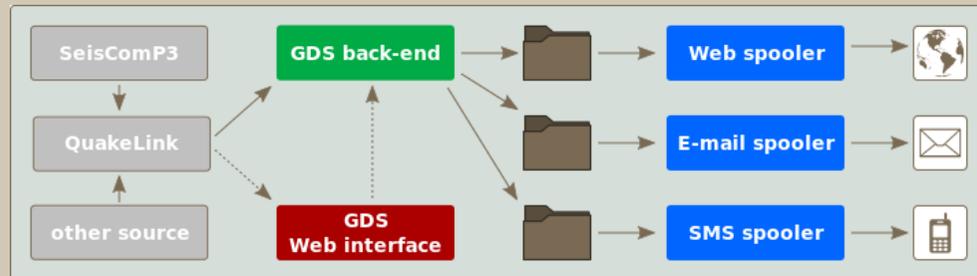
gempa developed a new protocol with a software implementation (QuakeLink) to exchange earthquake information in real-time or based on time windows. **QuakeLink** offers plug-ins to import earthquake information from different sources such as a SEISCOMP3 system.

GDS connects to QuakeLink to receive earthquake updates. Based on predefined criteria new earthquake information is filtered and forwarded to all matching queues. With the help of configurable templates bulletins are created and stored in spool directories. Service specific spoolers (e.g. email, SMS, fax, Web, etc.) send the bulletins to the subscribed recipients.

A Web interface (Figure 2) is provided which allows configuration of the GDS, interactive dissemination of bulletins and review of the dissemination history.

The Web interface ships with an user management which supports assignment of fine-grained privileges to users or groups of users. For instance the dissemination task can be strictly separated from the configuration part. Modifications to the configuration are tracked per user to be able to track certain changes.

## MODULAR ARCHITECTURE



**Figure 1** GDS Architecture showing different data providers, a back-end for filtering and bulletin generation, spooler applications, and a Web interface for configuration and review.

## CONFIGURATION

The central configuration unit is a **queue** having a set of criteria (filters) and associated subscriptions. If any of a queue's criteria matches the received earthquake information then processing of the configured subscriptions is triggered. In addition a queue can be configured to require a manual review before starting the dissemination chain.

A **criterion** supports the following filter parameters:

- geographic region (latitude/longitude bounding box)
- depth and magnitude thresholds
- evaluation mode (manual/automatic) of the event information
- phase count, magnitude count and quality information
- free key-value pairs (for example intensity, MMI etc.)

If these filter parameters do not suffice **external criteria** filtering scripts may be configured which operate directly on the event

information and report a match or mismatch via their exit code.

A **subscription** is defined through service, subscriber (user) and recipient information (address) and can be configured to be triggered only once or for each update (revision) of an earthquake. Typically an SMS is only sent out once, while an earthquake information Web page will be updated with every earthquake revision.

The **service** defines the bulletin template for formatting the content and the spool directory the content is placed in. If required the default template may be replaced by a subscription-specific template allowing the operator to generate different content for certain subscribers. Furthermore the service defines which dissemination information is logged and after what time (if at all) the log entries are purged.

The **subscriber** is a user or a group of user. By configuring the priority of the subscriber the dissemination order within one service is defined. Also a time window relative to the earthquake time may be defined to filter out early and potentially unstable solutions for certain users.

## WEB-BASED CONFIGURATION

The screenshot shows the 'Change queue' interface with the following details:

- Name:** search\_200\_germany
- Description:** A queue in the central configuration unit having a set of criteria and subscriptions associated to it. If any of the queue's criteria matches the received earthquake information, processing of the configured subscriptions is triggered.
- Criteria:** A table with columns: Name, Region, Evaluation Mode, Min. Phase Count, Max. Phase Count, Min. Magnitude, Max. Magnitude, Min. Magnitude, Max. Magnitude, Min. Depth, Max. Depth, Min. RMS, Deleted?.
- Subscriptions:** A table with columns: Subscriber, Service, Custom Filter, Service Target, Resend, Deleted?.

**Figure 2** Filter criteria and subscriptions

The screenshot shows the 'Permissions' interface with the following details:

- Active:** A checkbox to designate whether the user should be treated as active.
- Staff status:** A checkbox to designate whether the user can log into this admin site.
- Supervisor status:** A checkbox to designate that this user has all permissions without explicitly assigning them.
- User permissions:** A list of available user permissions such as 'user | service | subscribe | view | edit | delete | publish | log | event log | Can publish events | Can view event log'.

**Figure 3** Fine-grained access control