gempa

Activity Report

January – December 2024

Including:

Corrective Software Maintenance

On-Site Corrective Maintenance

Trainings Course

Documentation of Maintenance Activities 2024 (GEMPA GmbH)

Corrective Software Maintenance

Description: The software maintenance package comprises of technical support and trouble shooting of GEMPA/GFZ/AWI implemented software modules: SeisComP, TOAST, NAGIOS and WIKI support software. The tide gauge GUI/software and GPS GUI/software also come under this responsibility. To maintain this software, a qualified professional service is required. For software maintenance, proven knowledge and experience in above listed specific IT and system operation is mandatory. Remote support per telephone or email (2nd/3rd level support); during office hours, response time is one business day. BMKG is in charge for 1st level support.

International Expert Activities

Description: BMKG seeks on-site support to ensure that the warning centers forming the national earthquake monitoring and tsunami early warning system are running stable and reliably. Therefore some visits to the operational warning center in Jakarta and one on-site visit to the backup warning center in Denpasar/Bali are provided.

Activity Report:

#	Location	Time	International Expert	Description
1	Jakarta & Bali	10.02. – 21.02.2024	Ralph Henneberger & Enrico Ellguth	PGN: Warning Center Maintenance Jakarta & Bali
2	Jakarta & Bali	28.10. – 06.11.2024	Ralph Henneberger & Enrico Ellguth	PGN: Warning Center
3	Banda Aceh	19.02. – 20.02.2024	Dr. Bernd Weber	Tsunami Risk Workshop

Trainings by international Experts

Description: BMKG seeks the provision of specific training course focused on BMKG InaTEWS infrastructure and system components but also including scientific/technical classes on seismology, natural hazard, tsunami modeling. The following 2 training courses with the following topics where given.

#	Location	Time	International Expert	Description
1	Online	04.11. – 06.11.2024	Andreas Hoeffner	TOAST Course BMKG 2024

gempa

Corrective Software Maintenance

January – December

2024

Assistance with BMKG's Earthquake Monitoring and Tsunami Early Warning System.

Bali - SC3 + TOAST - Bug #5874

The difference in configuration and settings of toast between Bali and Jakarta

05/17/2024 08:35 PM - Muchrizal Abdul Jalil

Status:	Closed	**Due date:**	
Priority:	critical	**Spent time:**	0:15 hour
Assignee:	Muchrizal Abdul Jalil		
Category:			
Internal Assignee:	Enrico Ellguth	**Locked by:**	

Description

Hello,

1. The legend on the main checklist of Toast Jakarta for arrival time affects the arrival time modeling in the toast by merely changing the color and not displaying the warning zone legend, whereas in Bali, the arrival time modeling does not appear but the warning zone legend is displayed.

2. Running the tsunami and easywave modeling shows a difference in arrival time of more than 10 minutes for the same location. For example, we created a scenario for the same case in southern Bali, indicating a difference in arrival time (>10 minutes) at the same location.

Regards
Anomali

History

#1 - 05/21/2024 04:01 PM - Support Team

- Internal Assignee Enrico Ellguth added

#2 - 05/22/2024 09:43 AM - Wolfgang Kohl

- Status changed from New to Feedback

Dear Team Anomali,
could you please give us an more detailed description about the problem. Like we discussed during the phone call.
Regards
Wolfgang

#3 - 06/03/2024 07:15 PM - Thomas Bornstein

- Assignee changed from Support Team to Muchrizal Abdul Jalil

#4 - 06/05/2024 02:22 PM - Muchrizal Abdul Jalil

- Status changed from Feedback to Closed

Files

1.b.jpeg	303 KB	05/17/2024	Muchrizal Abdul Jalil
1.a.jpeg	380 KB	05/17/2024	Muchrizal Abdul Jalil
2.a.jpeg	45.2 KB	05/17/2024	Muchrizal Abdul Jalil
2.b.jpeg	47.8 KB	05/17/2024	Muchrizal Abdul Jalil
1.c.jpeg	328 KB	05/17/2024	Muchrizal Abdul Jalil

Bali - SC3 + TOAST - Question #5944

even list seiscomp pgr 3 bali from 2020 until des 2023

06/21/2024 08:54 AM - Dwi Hartanto

Status:	Closed	**Due date:**	
Priority:	standard	**% Done:**	100%
Assignee:	Dwi Hartanto	**Estimated time:**	0:00 hour
Category:		**Spent time:**	2:30 hours
Internal Assignee:		**Locked by:**	

Description

Morning gempa team, I want ask about even list earthquake in seiscomp pgr 3 bali from 2020 until now, because in seiscomp pgr3 bali only have event from end 2023 until 2024, since seiscomp upgrade last year.
can you add the old event from 2020 until des 2023 to the seiscomp bali. tks

best regards,
dwi

History

#1 - 06/21/2024 02:18 PM - Wolfgang Kohl

- Status changed from New to Accepted

Dear Dwi,
At the moment, SeisComP stores events for one year.

Could you please describe your use case?

If your goal is to analyze older events occasionally, we can connect SCOLV to the LTS database at startup.

Alternatively, if you need all events in the SeisComP database we could load them, but please note that this may reduce performance due to the increased database size.

If you only need a few older events(special events) which you analyze more often, we can load those events into the SeisComP database and blacklist them, ensuring they are not deleted in the future.

Regards

Wolfgang

#2 - 06/23/2024 10:00 AM - Dwi Hartanto

- File example historical picking.jpeg added

- File Rekap data 2020-2023.xlsx added

Dear wolfgang,

The events list we use not for analyze older events, but for analyze the first auto and manual picking for the event mag greater than 5 which disseminate by pgn/pgr3. so we don't need the waveform, just historical picking from the event. here attach the file event mag greater than 5 from 2020-2023.

regards,
dwi

#3 - 07/02/2024 07:02 PM - Wolfgang Kohl

Dear Dwi,
Event Import ============

1. Log onto the LTS data system in Jakarta
2. Dump the event IDs for a specific time window to file

```
scevtls -d localhost --begin "2020-01-01 00:00:00" --end "2023-12-31 23:59:59" > list.txt
```

3. Diplay the file and check the content

```
cat list.txt
```

4. Dump the selected events to disk with

```
mkdir /tmp/events
for line in $(cat list.txt) ;do seiscomp exec scxmldump -d localhost -E $line -PAMFf -p -o /tmp/events/$line.xml;echo $line;done

```

5. Check if events are available

```
ls /tmp/events/
```

6. Copy this folder to a directory of the SeisComP processing machine, e.g., Downloads

7. Log into the processing system
8. Disable the crontab which clean older events from the database of SeisComP.
```
crontab -e
```

8. Import the events into the database

```
for line in $(ls Downloads/events) ;do seiscomp exec scdb -i Downloads/events/$line -d localhost ;echo $line;done
```

Regards
Wolfgang

#4 - 07/04/2024 09:13 AM - Dwi Hartanto

Dear wolfgang,

Can you do it for us, because the Jakarta and AT2 teams are having difficulty to do it.

thank you,

regards,
dwi

#5 - 07/11/2024 08:46 AM - Wolfgang Kohl

- Status changed from Accepted to Resolved

Dear Dwi,
after our conversation yesterday it seems like you do not want me to import the events from the Jakarta lts-data.

If you need to have older event data only for Bali, you should think about an place to store the events.
Maybe at the next expert visit in October/November we can help you to set up this long time storage up.

Please tell me if there is more I can help you, if not we may close this ticket.

Regards
Wolfgang

#6 - 07/12/2024 08:28 AM - Dwi Hartanto

Dear wolfgang,

please wait after we check the lts data merge from bali and jakarta
thanks

regards,
dwi

#7 - 07/17/2024 08:32 AM - Wolfgang Kohl

- Status changed from Resolved to Feedback

- Assignee changed from Support Team to Dwi Hartanto

Dear Dwi,
yesterday I disabled the crontab for scdbstrip on proc2 in Bali, and I dumped you the events for 2020.
Please take a look at this events, if you are okay with the result, I can dump you the years 2021 - 2023.
Regards
Wolfgang

#8 - 12/05/2024 02:18 PM - Support Team

- Status changed from Feedback to Closed

- % Done changed from 0 to 100

Files

read event seiscomp 2023 blank.jpeg	124 KB	06/21/2024	Dwi Hartanto
example historical picking.jpeg	751 KB	06/23/2024	Dwi Hartanto
Rekap data 2020-2023.xlsx	271 KB	06/23/2024	Dwi Hartanto

Bali - SC3 + TOAST - Question #6178

check on the Nagios system in Backup system Bali

10/25/2024 04:13 PM - Muchrizal Abdul Jalil

Status:	Closed	**Due date:**	
Priority:	major	**% Done:**	0%
Assignee:	Support Team	**Estimated time:**	0:00 hour
Category:		**Spent time:**	0:00 hour
Internal Assignee:		**Locked by:**	

Description

Hello,

Please perform a check on the Nagios system in Backup system Bali and update the host information for all devices located in Backup system Bali

Regards,
Anomali

History

#1 - 10/26/2024 07:57 AM - Wolfgang Kohl

- Status changed from New to Closed

Dear Anomali Team,

This will be addressed during the Expert Visit in Jakarta, scheduled from October 28, 2024, to November 6, 2024.

Best regards,
Wolfgang

Bali - SC3 + TOAST - Task #6179

event data in Bali is not stored for an extended period.

10/25/2024 04:20 PM - Muchrizal Abdul Jalil

Status:	Closed	**Start date:**	10/25/2024
Priority:	major	**Due date:**	
Assignee:	Support Team	**% Done:**	0%
Category:		**Estimated time:**	0:00 hour
		Spent time:	0:00 hour
Internal Assignee:		**Locked by:**	

Description

Hello,

Please check to ensure that event data in Bali is not stored for an extended period and add access from Bali to the LTS data in Jakarta.

Regards,
Anomali

History

#1 - 10/26/2024 07:57 AM - Wolfgang Kohl

- Status changed from New to Closed

Dear Anomali Team,

This will be addressed during the Expert Visit in Jakarta, scheduled from October 28, 2024, to November 6, 2024.

Best regards,
Wolfgang

Bali - SC3 + TOAST - Task #6211

The TOAST Application Will Not Open

11/11/2024 04:23 PM - Muchrizal Abdul Jalil

Status:	Closed	**Start date:**	11/11/2024
Priority:	standard	**Due date:**	
Assignee:	Muchrizal Abdul Jalil	**% Done:**	100%
Category:		**Estimated time:**	0:00 hour
		Spent time:	0:15 hour
Internal Assignee:		**Locked by:**	

Description

Hello,

We are experiencing an issue with the new TOAST client (172.19.112.236) backup in Bali. The TOAST application will not open, showing a ConnectionError notification. We have tested the network communication from the new TOAST client (172.19.112.236) to the new TOAST server (172.19.112.237), but no issues were found, and the result was a successful reply.

Please address this issue promptly.

Regards,
Anomali

History

#1 - 11/11/2024 04:35 PM - Support Team

- Status changed from New to Resolved

- Assignee changed from Support Team to Muchrizal Abdul Jalil

- Priority changed from critical to standard

Hello,

please test again. The scmaster process of the toast server system was not running even the system has a crontab entry. This is really strange.

Enrico

#2 - 12/05/2024 02:18 PM - Support Team

- Status changed from Resolved to Closed

- % Done changed from 0 to 100

Files

Toast Error.jfif	190 KB	11/11/2024	Muchrizal Abdul Jalil
Test Ping Toast.jfif	139 KB	11/11/2024	Muchrizal Abdul Jalil

Bali - SC3 + TOAST - Task #6220

The output from the new TOAST client in Bali does not display a timestamp

11/13/2024 03:50 PM - Muchrizal Abdul Jalil

Status:	Closed	**Start date:**	11/13/2024
Priority:	major	**Due date:**	
Assignee:	Muchrizal Abdul Jalil	**% Done:**	100%
Category:		**Estimated time:**	0:00 hour
		Spent time:	3:00 hours
Internal Assignee:	Marit Möller	**Locked by:**	

Description

Hello,

We have received a report regarding the new TOAST client (172.19.112.236) backup in Bali. The output from the new TOAST client (172.19.112.236) in Bali does not display a timestamp (see attached image), while the output on the old TOAST does show a timestamp (see attached image). The new TOAST client and the old TOAST should display the same output.

Please address this issue promptly.

Regards,
Anomali

History

#1 - 11/13/2024 06:22 PM - Andreas Hoechner

- Internal Assignee Marit Möller added

#2 - 11/27/2024 09:19 PM - Marit Möller

- Status changed from New to Resolved

- Assignee changed from Support Team to Muchrizal Abdul Jalil

- % Done changed from 0 to 100

Hi team Anomali,

the timestamp is now visible on the bulletin maps of the new TOAST client in Jakarta and Bali.

Regards,
Marit

#3 - 11/28/2024 05:44 PM - Muchrizal Abdul Jalil

- Status changed from Resolved to Feedback

#4 - 11/29/2024 02:58 AM - Muchrizal Abdul Jalil

- File 678a2da4-148e-40fa-a338-b6b865740d8f.jfif added

- File 7723f16b-4ffb-44e9-a6e5-724c65164d56.jfif added

- File 5b92f1c4-fa61-404f-bfc2-b80910688af4.jfif added

- File ecd1ea78-6c4d-418a-b185-3cafc3574d84.jfif added

- File 734aadf7-a2fa-484d-b2a6-8245e5d33ba6.jfif added

Hi Marit,

After we checked, the output from the new TOAST client in Bali is now displaying the timestamp.
Thank you for your support.

Regards,
Anomali

#5 - 11/29/2024 03:00 AM - Muchrizal Abdul Jalil

- Status changed from Feedback to Closed

Files

new TOAST.jfif	41.7 KB	11/13/2024	Muchrizal Abdul Jalil
old TOAST.jfif	40.5 KB	11/13/2024	Muchrizal Abdul Jalil
678a2da4-148e-40fa-a338-b6b865740d8f.jfif	42.1 KB	11/28/2024	Muchrizal Abdul Jalil
7723f16b-4ffb-44e9-a6e5-724c65164d56.jfif	52 KB	11/28/2024	Muchrizal Abdul Jalil
5b92f1c4-fa61-404f-bfc2-b80910688af4.jfif	51.4 KB	11/28/2024	Muchrizal Abdul Jalil
ecd1ea78-6c4d-418a-b185-3cafc3574d84.jfif	269 KB	11/28/2024	Muchrizal Abdul Jalil
734aadf7-a2fa-484d-b2a6-8245e5d33ba6.jfif	313 KB	11/28/2024	Muchrizal Abdul Jalil

Bali - SC3 + TOAST - Bug #6315

ERORR TO OPEN TOAST NEW VERSION

01/05/2025 12:49 PM - Yogha Mahardikha Kuncoro Putra

Status:	Closed	**Due date:**	
Priority:	standard	**Spent time:**	0:00 hour
Assignee:	Yogha Mahardikha Kuncoro Putra		
Category:			
Internal Assignee:	Marit Möller	**Locked by:**	

Description

Dear GEMPA Team

I want to report that the latest version of TOAST installed at BMKG Bali cannot be opened. Please help to resolve this issue. Thank you.

History

#1 - 01/06/2025 06:57 PM - Thomas Bornstein

- Internal Assignee Marit Möller added

#2 - 01/06/2025 07:06 PM - Support Team

- Status changed from New to Feedback

- Assignee changed from Support Team to Yogha Mahardikha Kuncoro Putra

Hello,

We have fixed the problem with the automatic restart, which caused the scmaster on the toast server to be unavailable from time to time. Please restart the toast client. The problem should then no longer occur. I was able to start the toast client without any problems.

#3 - 01/06/2025 10:29 PM - Yogha Mahardikha Kuncoro Putra

- Status changed from Feedback to Closed

Files

Erorr when open TOAST Application.jpeg	135 KB	01/05/2025	Yogha Mahardikha Kuncoro Putra

BMKG - Task #6296

GNSS data import problems

12/16/2024 07:46 PM - Support Team

Status:	Feedback	**Start date:**	12/16/2024
Priority:	standard	**Due date:**	
Assignee:	Wolfgang Kohl	**% Done:**	0%
Category:		**Estimated time:**	0:00 hour
		Spent time:	0:30 hour
Internal Assignee:		**Locked by:**	

Description

We noticed that all stations of the XX network have no real time data. Looks like the source SeedLink at Bako gets no data anymore:

```
sysop@geof:~/seiscomp/etc/key/seedlink$ slinktool -Q 36.95.202.213:18000
XX BAKO      LB1 D 2024/09/16 21:50:15.0000  -  2024/09/19 12:21:12.0000
XX BAKO      LB2 D 2024/09/16 21:49:18.0000  -  2024/09/19 12:21:12.0000
XX BAKO      LB3 D 2024/09/16 21:49:18.0000  -  2024/09/19 12:21:12.0000
XX BAKO      LB4 D 2024/09/16 21:49:18.0000  -  2024/09/19 12:21:12.0000
XX BAKO      LB5 D 2024/09/16 21:49:18.0000  -  2024/09/19 12:21:12.0000
XX BAKO      LB6 D 2024/09/16 21:49:18.0000  -  2024/09/19 12:21:12.0000
XX BAKO      LBC D 2024/09/16 21:44:50.0000  -  2024/09/19 12:21:12.0000
XX BAKO      LBE D 2024/09/16 21:49:18.0000  -  2024/09/19 12:21:12.0000
XX BAKO      LBN D 2024/09/16 21:49:18.0000  -  2024/09/19 12:21:12.0000
XX BAKO      LBO D 2024/09/16 21:44:50.0000  -  2024/09/19 12:21:12.0000
```

History

#1 - 12/16/2024 07:53 PM - Support Team

- Subject changed from GNSS Daten Import problems to GNSS data import problems

#2 - 12/17/2024 12:38 PM - Wolfgang Kohl

Yedi will check it.

#3 - 12/20/2024 11:23 AM - Wolfgang Kohl

BIG did setup an new server.
IP: 36.92.41.75
At the moment there are working on the API.
I have no idea, how this API will look like later on.

#4 - 01/06/2025 05:12 PM - Support Team

Hi Wolfgang,

that is not so nice because the implemented solution for the data transfer via SeedLink protocol between BMKG and BIG worked well. Now no data is incoming until the new API is in place and a suitable data import plugin has been developed. This causes additional effort and costs and would not have been necessary.

Enrico

BMKG - SC3 + TOAST - Task #5867

Request For License Update MT & TOAST

05/08/2024 05:35 PM - Muchrizal Abdul Jalil

Status:	Closed	**Start date:**	05/08/2024
Priority:	critical	**Due date:**	
Assignee:	Muchrizal Abdul Jalil	**% Done:**	100%
Category:		**Estimated time:**	0:00 hour
		Spent time:	1:00 hour
Internal Assignee:	Kerstin de Wall	**Locked by:**	

Description

Hello,

Kindly proceed to follow up on the request for updating MT and TOAST licenses for BMKG Jakarta and Bali

Thankyou

Anomali

History

#1 - 05/08/2024 06:00 PM - Thomas Bornstein

- Internal Assignee Kerstin de Wall added

#2 - 05/08/2024 07:10 PM - Support Team

- Status changed from New to Feedback

- Assignee changed from Support Team to Muchrizal Abdul Jalil

- % Done changed from 0 to 100

update licenses
mt :
sc-mt (jakarta / lt2)
sc-backup (jakarta / lt3)
scgui (bali)

toast :

toastnew (jakarta / lt2)
toast-backup (jakarta / lt3)
toast (bali)

#3 - 05/21/2024 03:43 PM - Muchrizal Abdul Jalil

- Status changed from Feedback to Closed

Files

MT & TOAST 2.jpeg	49.8 KB	05/08/2024	Muchrizal Abdul Jalil
MT & TOAST 1.jpeg	144 KB	05/08/2024	Muchrizal Abdul Jalil

BMKG - SC3 + TOAST - Task #6113

"There are 2 station codes, PSI and SIJI, that cannot pull data from the NAQS Jakarta server to the Acqui Jakarta server."

09/12/2024 06:46 PM - Muchrizal Abdul Jalil

Status:	Closed	**Start date:**	09/12/2024
Priority:	critical	**Due date:**	
Assignee:	Muchrizal Abdul Jalil	**% Done:**	100%
Category:		**Estimated time:**	0:00 hour
		Spent time:	0:30 hour
Internal Assignee:	Thomas Bornstein	**Locked by:**	

Description

Hello,

We are experiencing issues with 2 stations with the following codes:

1. PSI
2. SIJI

We have checked both stations on the NAQS Jakarta server, and data streams are available. However, the acqui Jakarta server with IP 172.19.3.65 is unable to pull data from the NAQS Jakarta server.

Please follow up on this matter.

Regards
Anomali

History

#1 - 09/13/2024 02:42 PM - Wolfgang Kohl

- Status changed from New to Feedback

- Assignee changed from Support Team to Muchrizal Abdul Jalil

- % Done changed from 0 to 100

- Internal Assignee Thomas Bornstein added

Dear Anomali,

we had an look at the system, and the following file where missing. From seedlink log:

State file /home/sysop/seiscomp/var/run/seedlink/naqs:28000.nmxp not found or unable to read!
Fri Sep 13 02:58:47 2024 - seedlink: [nmxp1] starting shell

We created the missing file and now the data is available again.

sysop@new-sc-acq-172-19-3-65:~/seiscomp/var/run/seedlink$ cat naqs:28000.nmxp
IA.PSI.???
IA.SIJI.???

#2 - 10/25/2024 03:43 PM - Muchrizal Abdul Jalil

- Status changed from Feedback to Closed

BMKG - SC3 + TOAST - Task #6175

Switch Over New Geof

10/25/2024 03:19 PM - Muchrizal Abdul Jalil

Status:	Closed	**Start date:**	10/25/2024
Priority:	critical	**Due date:**	
Assignee:	Support Team	**% Done:**	0%
Category:		**Estimated time:**	0:00 hour
		Spent time:	0:00 hour
Internal Assignee:		**Locked by:**	

Description

Hello,

In February 2024, the setup on the new Geof server was completed, but the switchover has not yet been done. Here is a checklist for tasks to complete:

Verify TsunAWI Installation: Ensure TsunAWI is working on the new Geof system before the switchover, as toast-lt3 depends on it for simulations.

Verify WebDC Installation: Confirm that WebDC is correctly installed and operational.

Verify slmon Installation: Check that slmon is installed and functioning properly.

Sync SeedLink Configuration: Synchronize the SeedLink configuration with the current active Geof system.

Verify SeedLink Installation: Ensure that SeedLink is installed and operational.

Switchover to New Geof System: Update the IP address to transition to the new Geof server.

Conduct Final Tests: Perform final checks to confirm that all services are accessible via the official address https://geof.bmkg.go.id.

Regards,
Anomali

History

#1 - 10/26/2024 07:58 AM - Wolfgang Kohl

- Status changed from New to Closed

Dear Anomali Team,

This will be addressed during the Expert Visit in Jakarta, scheduled from October 28, 2024, to November 6, 2024.

Best regards,
Wolfgang

BMKG - SC3 + TOAST - Task #6176

Switchover to the New LTS Data System

10/25/2024 03:41 PM - Muchrizal Abdul Jalil

Status:	Closed	**Start date:**	10/25/2024
Priority:	critical	**Due date:**	
Assignee:	Support Team	**% Done:**	0%
Category:		**Estimated time:**	0:00 hour
		Spent time:	0:00 hour
Internal Assignee:		**Locked by:**	

Description

Hello,

Here's the English translation of your text:

"As previously mentioned, the Directorate of Earthquake and Tsunami has received a new storage system with a capacity of 70TB x 2 for Long-Term Storage (LTS) data. Please proceed with the finalization of the new LTS data system with the following steps:

1. Sync Configuration: Ensure that all configurations are synchronized.

2. Verify Data and Services: Check the available data and confirm that all required services are operational.

3. Switchover to the New LTS Data System: Update the IP address to transition from the old to the new LTS data system.

4. Conduct Final Tests: Perform final tests to confirm that data, including event data, is being received correctly."

Regards,
Anomali

History

#1 - 10/26/2024 07:58 AM - Wolfgang Kohl

- Status changed from New to Closed

Dear Anomali Team,

This will be addressed during the Expert Visit in Jakarta, scheduled from October 28, 2024, to November 6, 2024.

Best regards,
Wolfgang

BMKG - SC3 + TOAST - Task #6177

check on the Nagios system in Jakarta

10/25/2024 03:53 PM - Muchrizal Abdul Jalil

Status:	Closed	**Start date:**	10/25/2024
Priority:	major	**Due date:**	
Assignee:	Support Team	**% Done:**	0%
Category:		**Estimated time:**	0:00 hour
		Spent time:	0:00 hour
Internal Assignee:		**Locked by:**	

Description

Hello,

Please perform a check on the Nagios system in Jakarta and update the host information for all devices located in Jakarta.

Regards,
Anomali

History

#1 - 10/26/2024 07:57 AM - Wolfgang Kohl

- Status changed from New to Closed

Dear Anomali Team,

This will be addressed during the Expert Visit in Jakarta, scheduled from October 28, 2024, to November 6, 2024.

Best regards,
Wolfgang

BMKG - SC3 + TOAST - Task #6180

Installation of Server Hard disks for Proc

10/25/2024 04:42 PM - Muchrizal Abdul Jalil

Status:	Closed	**Start date:**	10/25/2024
Priority:	critical	**Due date:**	
Assignee:	Support Team	**% Done:**	0%
Category:		**Estimated time:**	0:00 hour
		Spent time:	0:00 hour
Internal Assignee:		**Locked by:**	

Description

Hello,

This year, there are two server hard disks each for proc 1 and proc 2 in Jakarta that need to be installed. Please provide support for the setup and configuration of the proc 1 and proc 2 servers in Jakarta.

Regards,
Anomali

History

#1 - 10/26/2024 07:57 AM - Wolfgang Kohl

- Status changed from New to Closed

Dear Anomali Team,

This will be addressed during the Expert Visit in Jakarta, scheduled from October 28, 2024, to November 6, 2024.

Best regards,
Wolfgang

BMKG - SC3 + TOAST - Task #6195

Synchronization via Quakelink from Proc 1 Jakarta (192.168.88.52) to LTS-data (172.19.2.115)

11/06/2024 06:39 AM - Muchrizal Abdul Jalil

Status:	Resolved	**Start date:**	11/06/2024
Priority:	major	**Due date:**	
Assignee:	Yedi Dermadi	**% Done:**	90%
Category:		**Estimated time:**	0:00 hour
		Spent time:	13:15 hours
Internal Assignee:		**Locked by:**	

Description

Hello,

We are experiencing issues with data synchronization via Quakelink from Proc 1 Jakarta (192.168.88.52) to LTS-data (172.19.2.115), which is not running smoothly, especially for earthquakes with focal mechanisms. The magnitude on Proc 1 Jakarta (192.168.88.52) differs from that on LTS-data (172.19.2.115), and LTS-data (172.19.2.115) lacks the Mw magnitude.

The results of the Quakelink query on Proc 1 Jakarta (192.168.88.52) differ from those on LTS-data (172.19.2.115). This discrepancy leads to differences in the database contents between Proc 1 Jakarta (192.168.88.52) and LTS-data (172.19.2.115), affecting the event listings.

The preferred magnitude on Proc 1 Jakarta (192.168.88.52) should always match that on LTS-data (172.19.2.115).

Please address this issue promptly.

Regards,
Anomali

History

#1 - 11/06/2024 09:46 AM - Mr. Imangeo

Tks infonya mas Rizal, sdh diteruskan emailnya via ticketing ke Gempa kan?

#2 - 11/06/2024 10:23 AM - Support Team

Hello,

I can confirm that the support team has received your request. This issue is already known and we will fix this when we are back in the office.

Finally please reply to tickets in English as the support team does not speak Bahasa Indonesia. Thanks.

Enrico

#3 - 11/06/2024 10:23 AM - Support Team

- Status changed from New to Accepted

#4 - 11/06/2024 04:19 PM - Mr. Imangeo

Understood enrico,
Thank you for your support.

Best regards,
Iman

#5 - 11/14/2024 05:25 PM - Support Team

Hello,

just a quick update on this topic. At the moment we are doing some test and have to wait for the results. We will update the ticket when we have more information.

Enrico

#6 - 11/20/2024 09:52 PM - Support Team

- File proc1-20241120.txt added

- File proc2-20241120.txt added

Hello,

again a short update. At the moment we are testing a new ql2sc setup for proc1 and proc2 in Bali. The new setup should ensure that both systems detect the same earthquakes(preferred origin and magnitude). We compare the detected earthquakes of both system from time to time to ensure that the new setup fulfill the requirements. The testing may take some more days before we can transfer the setup to proc1 and lts data. Please find attached the results of today. We will update the ticket when we have further information.

Enrico

#7 - 11/21/2024 02:46 PM - Support Team

- File proc2-20241121.txt added

- File proc1-20241121.txt added

#8 - 11/21/2024 03:32 PM - Support Team

- Status changed from Accepted to Resolved

- Assignee changed from Support Team to Muchrizal Abdul Jalil

- Priority changed from critical to standard

Hello,

we just updated the ql2sc configuration of the lts data system. Now we use a similar configuration like we do it in Bali. With the new configuration in place the Mw magnitude should be taken into account by the lts data system as well. Please have in mind that the configuration change applies to upcoming events only. Please report back if the issue is solved. Thanks.

Enrico

#9 - 11/22/2024 02:44 PM - Support Team

- File proc1-20241122.txt added

- File proc2-20241122.txt added

#10 - 11/22/2024 03:31 PM - Support Team

- File proc1-jkt-20241122.txt added

- File ltsdata-20241122.txt added

Hello again,

today we checked the synchronized events of the last hours on the lts data system and there was still some differences. It turned out that the ql2sc configuration contained a typo which may have caused the issue. We will continue the monitoring and update the ticket when we have more information. Please find attached the comparison results of today attached.

Enrico

#11 - 11/22/2024 03:33 PM - Support Team

- Status changed from Resolved to Accepted

- % Done changed from 0 to 70

#12 - 11/27/2024 04:51 PM - Support Team

- File proc1-jkt-20241127.txt added

- File ltsdata-20241127.txt added

- File bmg2024xdfu-proc1.xml added

- File bmg2024xdfu-ltsdata.xml added

- Assignee changed from Muchrizal Abdul Jalil to Support Team

Today we checked the detected earthquakes of both systems again and the both lists still differ. We had a closer look at event **bmg2024xdfu** and it looks like some journal entries are processed again and again. This could be an explanation why the magnitude type is different for this specific event because it is flipping a while and then it stops at a certain point with the wrong type. We changed the ql2sc module configuration slightly to avoid this

behavior. We will check the detected earthquakes tomorrow again.

Enrico

#13 - 11/28/2024 03:49 PM - Support Team

Just for information we have updated the QL setups for Jakarta and Bali. The new configuration is easier to understand and we think it solves some still existing synchronization issues. For more details about what have been changed check the corresponding Git commits.

Enrico

#14 - 12/02/2024 07:40 PM - Support Team

Hello,

just for information we have documented the updated EQ data flow between Bali and Jakarta in the wiki here.

Enrico

#15 - 12/04/2024 01:35 PM - Wolfgang Kohl

Just for documentation reason.
We could not access the new lts-data with the IP 172.19.2.115 on port 18180 and 172.19.2.115 on port 3306.
We asked Yedi for help, and he arranged that the second LAN port of the server was configured to the BMKG network, so we now have access to the new lts-data on the port 18180 and 3306.

#16 - 12/05/2024 02:26 PM - Support Team

- % Done changed from 70 to 90

Here a short update: The new QL configuration of the systems looks promising and most of the time earthquake solutions are exchanged as expected. Unfortunately there is still an issue with the synchronization of the Mw magnitude when it is manually fixed by an operator with the scolv. To analyze the issue we have increased the log level of the specific module to get more information. We will update the ticket when we have more information.

Enrico

#17 - 12/17/2024 10:26 PM - Support Team

Today we compared the EQ solutions of proc1 and lts data again and we found that still the MW magnitude was not set preferred on the lts data system. This happens rarely and only the MW magnitude is affected. Due to this reason we spent more time on the issue and we could identify an issue in the ql2sc module which may causing the problem. We will fix this and update the system within the next days.

Enrico

#18 - 01/06/2025 08:02 AM - Yedi Dermadi

- Priority changed from standard to major

Dear Support Team,

Has this problem been resolved?

#19 - 01/06/2025 05:36 PM - Support Team

Hi Yedi,

this issue has not been resolved yet since we have to do further tests before we can release a new version of the ql2sc module. We will update the ticket when we are ready.

Mr. Wolfgang told me that you do not want to change the ql2sc configuration so that both manual and automatic solutions are transferred to the LTS data system. That is OK but it would have also solved the
MW issue without deploying an update.

Enrico

#20 - 01/13/2025 04:43 PM - Support Team

Hi Yedi,

FYI we have installed a new version of the ql2sc binary on the main processing in Jakarta. The patch addresses the MW issue. We will monitor the systems and report back here.

Enrico

#21 - 01/14/2025 06:49 PM - Support Team

- File proc1-20250114.txt added

- File ltsdata-20250114.txt added

We have compared the earthquakes of the last day of proc1 and ltsdata and both systems share the same events - This is great. But we will continue the monitoring since no MW magnitude has been exchanged yet.

Enrico

#22 - 01/21/2025 05:57 PM - Support Team

- Status changed from Accepted to Resolved

- Assignee changed from Support Team to Yedi Dermadi

Hi Yedi,

I have good news. The synchronization issue via QuakeLink from proc 1 to LTS data is resolved. I know it took a while, but the synchronization of the systems is not easy. Please check the systems by yourself and close the ticket when everything is OK.

Enrico

#23 - 01/23/2025 08:10 AM - Yedi Dermadi

Hi Enrico,

It sounds good that the synchronization issue has been resolved. I have verified this on lts-data and proc1.

Regards,

Files

lts1.jfif	740 KB	11/05/2024	Muchrizal Abdul Jalil
lts.jfif	340 KB	11/05/2024	Muchrizal Abdul Jalil
proc2-20241120.txt	2.59 KB	11/20/2024	Support Team
proc1-20241120.txt	2.54 KB	11/20/2024	Support Team
proc1-20241121.txt	2.54 KB	11/21/2024	Support Team
proc2-20241121.txt	2.49 KB	11/21/2024	Support Team
proc1-20241122.txt	2.7 KB	11/22/2024	Support Team
proc2-20241122.txt	2.7 KB	11/22/2024	Support Team
proc1-jkt-20241122.txt	1.15 KB	11/22/2024	Support Team
ltsdata-20241122.txt	1.14 KB	11/22/2024	Support Team
proc1-jkt-20241127.txt	2.77 KB	11/27/2024	Support Team
ltsdata-20241127.txt	2.59 KB	11/27/2024	Support Team
bmg2024xdfu-proc1.xml	267 KB	11/27/2024	Support Team
bmg2024xdfu-ltsdata.xml	253 KB	11/27/2024	Support Team
ltsdata-20250114.txt	2.21 KB	01/14/2025	Support Team
proc1-20250114.txt	2.21 KB	01/14/2025	Support Team

BMKG - SC3 + TOAST - Task #6222

How is the status of data synchronization from the old LTS to the new LTS

11/15/2024 11:16 AM - Muchrizal Abdul Jalil

Status:	Closed	**Start date:**	11/15/2024
Priority:	standard	**Due date:**	
Assignee:	Muchrizal Abdul Jalil	**% Done:**	100%
Category:		**Estimated time:**	0:00 hour
		Spent time:	8:00 hours
Internal Assignee:		**Locked by:**	

Description

Hello,

Just want to remind, how is the status of data synchronization from the old LTS to the new LTS, has it been completed?
Please make sure that storage mounting is already implemented automatically in the new LTS

Regards,
Anomali

History

#1 - 11/15/2024 04:51 PM - Support Team

- Status changed from New to Accepted

- Assignee changed from Support Team to Muchrizal Abdul Jalil

- Priority changed from major to standard

Hello,

The process is still running!
At the moment we are at:

```
...
2023/IA/LEM/BHN.D/IA.LEM..BHN.D.2023.085
2023/IA/LEM/BHN.D/IA.LEM..BHN.D.2023.086
2023/IA/LEM/BHN.D/IA.LEM..BHN.D.2023.087
2023/IA/LEM/BHN.D/IA.LEM..BHN.D.2023.088
2023/IA/LEM/BHN.D/IA.LEM..BHN.D.2023.089
2023/IA/LEM/BHN.D/IA.LEM..BHN.D.2023.090
2023/IA/LEM/BHN.D/IA.LEM..BHN.D.2023.091
2023/IA/LEM/BHN.D/IA.LEM..BHN.D.2023.092
2023/IA/LEM/BHN.D/IA.LEM..BHN.D.2023.093
...
```

#2 - 12/05/2024 02:20 PM - Support Team

Hello,

The process is still running!
At the moment we are at:

2024/IA/MUTSI/HNZ.D/IA.MUTSI..HNZ.D.2024.247
2024/IA/MUTSI/HNZ.D/IA.MUTSI..HNZ.D.2024.248
2024/IA/MUTSI/HNZ.D/IA.MUTSI..HNZ.D.2024.249
2024/IA/MUTSI/HNZ.D/IA.MUTSI..HNZ.D.2024.250
2024/IA/MUTSI/HNZ.D/IA.MUTSI..HNZ.D.2024.251
2024/IA/MUTSI/HNZ.D/IA.MUTSI..HNZ.D.2024.252
2024/IA/MUTSI/HNZ.D/IA.MUTSI..HNZ.D.2024.253

#3 - 01/06/2025 08:04 AM - Yedi Dermadi

Dear Support Team,

What is the current status of data synchronization from the old LTS to the new LTS? Has it been completed?

#4 - 01/06/2025 05:50 PM - Support Team

- Status changed from Accepted to Resolved

- % Done changed from 0 to 100

year	old	new
2000	1.1G	1.1G
2001	3.7M	3.7M
2002	4.0K	4.0K
2003	3.8G	3.8G
2004	205M	205M
2005	633M	633M
2006	157G	157G
2007	334G	334G
2008	694G	694G
2009	1.5T	1.5T
2010	2.1T	2.1T
2011	1.8T	1.8T
2012	1.8T	1.8T
2013	1.8T	1.8T
2014	2.2T	2.2T
2015	2.3T	2.3T
2016	2.0T	2.0T
2017	1.8T	1.8T
2018	2.0T	2.0T
2019	2.5T	2.5T
2020	5.5T	5.5T
2021	6.4T	6.4T
2022	7.8T	7.8T
2023	9.0T	9.0T
2024	12T	12T

#5 - 01/23/2025 12:23 PM - Muchrizal Abdul Jalil

- Status changed from Resolved to Closed

BMKG - SC3 + TOAST - Task #6223

The SQLX system from Pusat Instrumentasi can't mounting the new lts-data

11/15/2024 02:54 PM - Yedi Dermadi

Status:	Closed	**Start date:**	11/15/2024
Priority:	standard	**Due date:**	
Assignee:	Yedi Dermadi	**% Done:**	100%
Category:		**Estimated time:**	0:00 hour
		Spent time:	0:30 hour
Internal Assignee:		**Locked by:**	

Description

Dear Support Team,

The SQLX system from Pusat Instrumentasi can't mount the new lts-data, they also informed us that port 2049 is not open/allowed in new lts-data. Please check so that the SQLX system can mount the new lts-data. Thank you.

Regards,

History

#1 - 11/15/2024 04:48 PM - Support Team

- Status changed from New to Feedback

- Assignee changed from Support Team to Yedi Dermadi

- Priority changed from critical to standard

- % Done changed from 0 to 100

Hello,

There was probably an nfs server on the old lts-data..
I have set this up on the new lts-data in the same way as on the old one.

```
root@lts-data:~# exportfs
/home/data/archive/SDS_ARCHIVE
        172.19.3.28
/home/data/archive/SDS_ARCHIVE
        192.168.76.19
```

Regards Ralph

#2 - 11/26/2024 03:26 PM - Support Team

- Status changed from Feedback to Closed

I think this issue has been fixed. I close the ticket.

Enrico

BMKG - SC3 + TOAST - Task #6233

Can't connect to MySQL server on 'lts-data:3306' from other machine

11/20/2024 05:18 PM - Yedi Dermadi

Status:	Closed	**Start date:**	11/20/2024
Priority:	standard	**Due date:**	
Assignee:	Yedi Dermadi	**% Done:**	100%
Category:		**Estimated time:**	0:00 hour
		Spent time:	0:15 hour
Internal Assignee:	Ralph Henneberger	**Locked by:**	

Description

Dear Support Team,

We observe this error when do this command from other machine, for instance :
seiscomp exec scbulletin -d mysql://sysop:sysop@172.19.2.115/seiscomp -E bmg2017zqwg

Can't connect to MySQL server on 'lts-data:3306' from other machine. (see attachment)

Best regards,

History

#1 - 11/20/2024 09:44 PM - Support Team

- Internal Assignee Ralph Henneberger added

#2 - 11/21/2024 09:38 PM - Support Team

- Status changed from New to Feedback

- Assignee changed from Support Team to Yedi Dermadi

- Priority changed from critical to standard

- % Done changed from 0 to 100

The mariadb server should now be accessible.

```
root@lts-data:/etc/mysql/mariadb.conf.d# netstat -tulpen | grep 3306
tcp        0      0 0.0.0.0:3306            0.0.0.0:*               LISTEN      114        18247466   3230235/
mariadbd
```

Regards Ralph

#3 - 11/26/2024 03:25 PM - Support Team

Hi Yedi,

have you had some time to test the database connection to the lts data system? If everything is OK, we would like to close this ticket. Thanks.

Enrico

#4 - 11/28/2024 09:10 AM - Yedi Dermadi

Dear Enrico,

The database connection to the lts data system is OK now. Thanks.

Regards,

#5 - 11/28/2024 02:02 PM - Support Team

- Status changed from Feedback to Closed

Hi Yedi,

thanks for the confirmation. I close the ticket.

Enrico

Files

Screenshot from 2024-11-20 17-11-57.png	55.8 KB	11/20/2024	Yedi Dermadi

BMKG - SC3 + TOAST - Question #6240

Error open application new toast system

11/25/2024 02:41 PM - Dwi Hartanto

Status:	Closed	**Due date:**	
Priority:	major	**% Done:**	100%
Assignee:	Dwi Hartanto	**Estimated time:**	0:00 hour
Category:		**Spent time:**	0:00 hour
Internal Assignee:		**Locked by:**	

Description

Dear Support Team,

We find this error when we open new toast system:
Could not establish connection for;
Host:toast-server:18181/production (attach file)
user: toast-client-toast
thank you for attention

Best regards,

History

#1 - 11/25/2024 06:21 PM - Support Team

- Status changed from New to Resolved

- Assignee changed from Support Team to Dwi Hartanto

Hi Dwi,

I have restarted the scmaster module on the TOAST server system to fix the issue. Please try to open TOAST again on the GUI system. If the issue happens again please report back here. Thanks.

Enrico

#2 - 11/25/2024 06:59 PM - Dwi Hartanto

- File IMG-20241125-WA0015.jpg added

Hi Enrico,

Thanks for the support, the new toast now does't show error.

Regards,
Dwi

#3 - 11/25/2024 07:15 PM - Support Team

Great to hear that it is working now. If the issue happens again I will do additional checks.

Enrico

#4 - 11/28/2024 02:02 PM - Support Team

- Status changed from Resolved to Closed

- % Done changed from 0 to 100

Files

WhatsApp Image 2024-11-25 at 10.12.30 AM.jpeg	88.7 KB	11/25/2024	Dwi Hartanto
IMG-20241125-WA0015.jpg	432 KB	11/25/2024	Dwi Hartanto

BMKG - SC3 + TOAST - Task #6273

the Easywave and TsunaWI simulations could not be executed

12/04/2024 01:11 PM - Muchrizal Abdul Jalil

Status:	Closed	**Start date:**	12/04/2024
Priority:	critical	**Due date:**	
Assignee:	Muchrizal Abdul Jalil	**% Done:**	0%
Category:		**Estimated time:**	0:00 hour
		Spent time:	1:00 hour
Internal Assignee:		**Locked by:**	

Description

Hello,

We have received a report of an issue with the old TOAST system located on the 2nd floor in Jakarta, along with its backup system. During the daily routine tests, the Easywave and TsunaWI simulations could not be executed.

Attached is the video for reference.

Regards,
Anomali

History

#1 - 12/04/2024 02:32 PM - Support Team

- Status changed from New to Feedback

Hello,

I logged into both systems. On the backup system I could load EasyWave2 and TsunAWI simulations of incidents from the last days. On the warning room system I could only load data from TsunAWI simulations. I checked the filesystem storage and it turned out that the EasyWave2 Archive only contains a few simulations. That means the TOAST database and the file storage are not in sync which could explain why you could not load data for specific simulations. It looks for me that you have purged the local simulation file storage. Can you confirm this?
Please try to start/run a new simulation and report back. I am pretty sure that the simulation data can be loaded successfully.

Enrico

#2 - 12/04/2024 02:32 PM - Support Team

- Assignee changed from Support Team to Muchrizal Abdul Jalil

#3 - 12/04/2024 04:28 PM - Muchrizal Abdul Jalil

- File WhatsApp Video 2024-12-04 at 16.05.26.mp4 added

Support Team wrote in #note-1:

> Hello,
>
> I logged into both systems. On the backup system I could load EasyWave2 and TsunAWI simulations of incidents from the last days. On the warning room system I could only load data from TsunAWI simulations. I checked the filesystem storage and it turned out that the EasyWave2 Archive only contains a few simulations. That means the TOAST database and the file storage are not in sync which could explain why you could not load data for specific simulations. It looks for me that you have purged the local simulation file storage. Can you confirm this?
> Please try to start/run a new simulation and report back. I am pretty sure that the simulation data can be loaded successfully.
>
> Enrico

Hello Enrico,

We have attempted to rerun the old TOAST system, but the results remain the same as before. We also compared it with the new TOAST system, where the Easywave simulation runs smoothly.

Regards,
Anomali

#4 - 12/04/2024 04:34 PM - Muchrizal Abdul Jalil

Support Team wrote in #note-1:

> Hello,
>
> I logged into both systems. On the backup system I could load EasyWave2 and TsunAWI simulations of incidents from the last days. On the warning room system I could only load data from TsunAWI simulations. I checked the filesystem storage and it turned out that the EasyWave2 Archive only contains a few simulations. That means the TOAST database and the file storage are not in sync which could explain why you could not load data for specific simulations. It looks for me that you have purged the local simulation file storage. Can you confirm this?
> Please try to start/run a new simulation and report back. I am pretty sure that the simulation data can be loaded successfully.
>
> Enrico

Hello Enrico,

We have attempted to rerun the old TOAST system, but the results remain the same as before. We also compared it with the new TOAST system, where the Easywave simulation runs smoothly.

Regards,
Anomali

#5 - 12/04/2024 05:21 PM - Support Team

Hello again,

can we start simulations on the system at the second floor remotely for testing?

Enrico

#6 - 12/04/2024 05:30 PM - Support Team

And please also confirm that TOAST LT3 is working. Thanks

Enrico

#7 - 12/04/2024 05:33 PM - Muchrizal Abdul Jalil

Support Team wrote in #note-6:

> And please also confirm that TOAST LT3 is working. Thanks
>
> Enrico

Hello Enrico,

Yes, you can start simulations remotely on the system located on the second floor for testing purposes. Please let us know if you need any assistance or if further configuration is required.

Best regards,
Anomali

#8 - 12/04/2024 05:44 PM - Muchrizal Abdul Jalil

Support Team wrote in #note-6:

> And please also confirm that TOAST LT3 is working. Thanks
>
> Enrico

Hello Enrico,

We regularly check the EasyWave simulation on the old TOAST system, and so far, the EasyWave simulation on the old TOAST system has not been running smoothly.

Regards,
Anomali

#9 - 12/04/2024 05:55 PM - Support Team

- File toast-bmkg-lt2-ew-working.png added

> We regularly check the EasyWave simulation on the old TOAST system, and so far, the EasyWave simulation on the old TOAST system has not been running smoothly.

I talked about the TOAST installation at the third floor. Did you checked this as well? I asked because before EasyWave and TsunAWI simulations run smoothly on the backup system.

Regarding the TOAST instatallation at the warning room I logged in again, created a new incident and computed EasyWave and TsunAWI simulations. Please restart the TOAST system at the warning room and check the latest incident. Please see the attached screenshot.

Enrico

#10 - 12/04/2024 07:31 PM - Muchrizal Abdul Jalil

- File WhatsApp Image 2024-12-04 at 19.02.06.jpeg added

Muchrizal Abdul Jalil wrote in #note-7:

> Support Team wrote in #note-6:
>
> > And please also confirm that TOAST LT3 is working. Thanks
> >
> > Enrico
>
> Hello Enrico,
>
> Yes, you can start simulations remotely on the system located on the second floor for testing purposes. Please let us know if you need any assistance or if further configuration is required.
>
> Best regards,
> Anomali

Hello Enrico,

We have tested the old TOAST system in the operational room on the second floor by deleting the simulation incident data on the TOAST GUI and pushing three different events back to TOAST. The EasyWave2 simulations ran smoothly.

Regards,
Anomali

Muchrizal Abdul Jalil wrote in #note-7:

> Support Team wrote in #note-6:
>
> > And please also confirm that TOAST LT3 is working. Thanks
> >
> > Enrico
>
> Hello Enrico,
>
> Yes, you can start simulations remotely on the system located on the second floor for testing purposes. Please let us know if you need any assistance or if further configuration is required.
>
> Best regards,
> Anomali

#11 - 12/04/2024 07:31 PM - Muchrizal Abdul Jalil

- Status changed from Feedback to Resolved

#12 - 12/04/2024 07:38 PM - Muchrizal Abdul Jalil

- Status changed from Resolved to Closed

Files

WhatsApp Video 2024-12-04 at 13.09.53.mp4	3.04 MB	12/04/2024	Muchrizal Abdul Jalil

WhatsApp Video 2024-12-04 at 16.05.26.mp4	9.38 MB	12/04/2024	Muchrizal Abdul Jalil
toast-bmkg-lt2-ew-working.png	737 KB	12/04/2024	Support Team
WhatsApp Image 2024-12-04 at 19.02.06.jpeg	163 KB	12/04/2024	Muchrizal Abdul Jalil

BMKG - SC3 + TOAST - Task #6298

LTS data can not be mounted by SQLX Server

12/17/2024 01:28 PM - Yedi Dermadi

Status:	Closed	**Start date:**	12/17/2024
Priority:	standard	**Due date:**	
Assignee:	Yedi Dermadi	**% Done:**	100%
Category:		**Estimated time:**	0:00 hour
		Spent time:	0:15 hour
Internal Assignee:		**Locked by:**	

Description

Dear Support Team,

Our colleagues from Instrumentasi has informed that SQLX server can not mount the LTS-Data, see the screenshot for detail (attached).

Best regards,

History

#1 - 12/17/2024 02:28 PM - Support Team

- Status changed from New to Feedback

- Assignee changed from Support Team to Yedi Dermadi

- Priority changed from major to standard

- % Done changed from 0 to 100

Hello Yedi,

Please try it again.

Regards Ralph

#2 - 12/17/2024 03:25 PM - Yedi Dermadi

- File IMG-20241217-WA0000.jpg added

Dear Ralph,

Already try again, but still, LTS-data can not be mounted to SQLX. See attachment FOR dr

#3 - 12/17/2024 07:34 PM - Yedi Dermadi

- File IMG-20241217-WA0000.jpg added

- Assignee changed from Yedi Dermadi to Support Team

Dear Ralph,

Already try again by Instrumentasi people, but still access denied, LTS-data can not be mounted to SQLX. See attachment for detail info.

Regards,

#4 - 12/17/2024 08:44 PM - Support Team

- Assignee changed from Support Team to Yedi Dermadi

Hello Yedi,

Please try again now.
If it does not work again, can I have root access to this system?

#5 - 01/06/2025 08:05 AM - Yedi Dermadi

- Status changed from Feedback to Closed

#6 - 01/06/2025 07:09 PM - Support Team

Hello Yedi,

I'm closing the ticket because nothing has happened here for several days. I would be happy to receive feedback on such tickets so I know that it has been solved!

Regards Ralph

Files

WhatsApp Image 2024-12-17 at 10.47.23 AM.jpeg	42.2 KB	12/17/2024	Yedi Dermadi
IMG-20241217-WA0000.jpg	213 KB	12/17/2024	Yedi Dermadi
IMG-20241217-WA0000.jpg	213 KB	12/17/2024	Yedi Dermadi

BMKG - SC3 + TOAST - Task #6316

new TOAST system in both Jakarta and Bali is unable to run the TOAST application.

01/05/2025 01:20 PM - Muchrizal Abdul Jalil

Status:	Closed	**Start date:**	01/05/2025
Priority:	major	**Due date:**	
Assignee:	Wolfgang Kohl	**% Done:**	0%
Category:		**Estimated time:**	0:00 hour
		Spent time:	0:15 hour
Internal Assignee:		**Locked by:**	

Description

Hello,

We received information from the BMKG operator that the new TOAST system in both Jakarta and Bali is unable to run the TOAST application.

Please follow up on this matter as soon as possible.

Regards,
Anomali

History

#1 - 01/05/2025 06:08 PM - Wolfgang Kohl

Dear Jalil,
please check Bali and Jakarta.
Regards

#2 - 01/06/2025 06:59 AM - Dwi Hartanto

- Assignee changed from Muchrizal Abdul Jalil to Wolfgang Kohl

Dear Wollie,

Toast bali already working well

thanks,
dwi

#3 - 01/06/2025 02:38 PM - Support Team

Hello,

just for information we are checking the TOAST system in Bali especially why the SC services are not started automatically. During this time the system is not usable. We will update the ticket when the system is operational again.

Enrico

#4 - 01/06/2025 03:31 PM - Muchrizal Abdul Jalil

- Status changed from New to Closed

#5 - 01/06/2025 03:35 PM - Support Team

Hello again,

we have fixed the crontab entry of the toast server system in Bali. Due to a typo the SC services were not started automatically if required.

Enrico

Files

Toast 1.jfif	170 KB	01/05/2025	Muchrizal Abdul Jalil
Toast 2.jfif	282 KB	01/05/2025	Muchrizal Abdul Jalil

BMKG - Technical Problems - Task #6243

webdc3 and fdsnws geof.bmkg.go.id

11/26/2024 09:41 AM - Yedi Dermadi

Status:	Closed	**Start date:**	11/26/2024
Priority:	critical	**Due date:**	
Assignee:	Support Team	**% Done:**	0%
Category:		**Estimated time:**	0:00 hour
		Spent time:	0:00 hour
Internal Assignee:		**Locked by:**	

Description

Dear Support Team,

After update the inventory file (scXML format) on geof.bmkg.go.id and lts-data e.g. cp IA.PPSI.xml to ~/seiscomp/etc/inventory/, when we try to download that inventory file through geof.bmkg.go.id/webdc3 or geof.bmkg.go.id/fdsnws, we can not get the updated one!

Best regards,

History

#1 - 11/26/2024 03:25 PM - Wolfgang Kohl

- Status changed from New to Accepted

Dear Yedi,

I just downloaded the xml from the station PPSI and we have an updated epoche(2024-11-23) for the streams HH? and SH?.
It looks fine for me. Or should there be an newer epoche?

```
scinv ls --level cha ppsi2sc3.xml
Parsing ppsi2sc3.xml ... done
Merging inventory ... done
network IA       BMG-Net, Indonesia (IA-Net)
epoch 1980-01-01
station PPSI   Station Pulau Pagai, Sumatra
epoch 2008-01-01
location __
epoch 2008-01-01
channel BHE
epoch 2008-01-01 - 2021-10-13
channel BHN
epoch 2008-01-01 - 2021-10-13
channel BHZ
epoch 2008-01-01 - 2021-10-13
channel HNE
epoch 2008-01-01 - 2021-10-13
channel HNE
epoch 2023-03-18 07:00:00 - 2024-11-23 11:22:00
channel HNE
epoch 2024-11-23 11:22:00
channel HNN
epoch 2008-01-01 - 2021-10-13
channel HNN
epoch 2023-03-18 07:00:00 - 2024-11-23 11:22:00
channel HNN
epoch 2024-11-23 11:22:00
channel HNZ
epoch 2008-01-01 - 2021-10-13
channel HNZ
epoch 2023-03-18 07:00:00 - 2024-11-23 11:22:00
channel HNZ
epoch 2024-11-23 11:22:00
channel SHE
epoch 2008-01-01 - 2021-10-13
channel SHE
epoch 2021-10-13 - 2024-11-23 11:22:00
```

channel SHE
epoch 2024-11-23 11:22:00
channel SHN
epoch 2008-01-01 - 2021-10-13
channel SHN
epoch 2021-10-13 - 2024-11-23 11:22:00
channel SHN
epoch 2024-11-23 11:22:00
channel SHZ
epoch 2008-01-01 - 2021-10-13
channel SHZ
epoch 2021-10-13 - 2024-11-23 11:22:00
channel SHZ
epoch 2024-11-23 11:22:00

#2 - 11/28/2024 09:48 AM - Yedi Dermadi

Dear Support Team,

Ok, now looks fine if we download the scXML metadata from geof.bmkg.go.id/fdsnws or geof.bmkg.go.id/webdc3.

Actually, on Tuesday 26 Nov 2024 we have updated the scXML inventory files of PPSI, EDFI, CTJI, BWJI on lts-data, geof, and other machines. Please advice us, what should we do in the future when we update the new inventory file(s) on lts-data and geof? is there any additional command that should be executed on geof.bmkg.go.id and lts-data so then it can impact to the geof's fdsnws and webdc3 and we can get the updated one of scXML inventory file by using geof.bmkg.go.id/fdsnws or geof.bmkg.go.id/webdc3 ?

Regards,

#3 - 12/05/2024 03:07 PM - Yedi Dermadi

Dear Support Team,

What should we do in the future when we update the new inventory file(s) to the lts-data and geof?
is there any additional command that should be executed on geof.bmkg.go.id and lts-data so then it can impact to the geof's fdsnws and webdc3 services ?

After we do the update of scxml inventory file(s), We hope we can get the updated one of scXML inventory when using geof.bmkg.go.id/fdsnws or geof.bmkg.go.id/webdc3.

Best regards,

#4 - 12/05/2024 03:25 PM - Wolfgang Kohl

- Status changed from Accepted to Closed

Dear Yedi,
after you uploaded the new station.xml file, normally you only have to make an

seiscomp update-config

and

seiscomp restart

After this all new inventory should be availble on webdc3 and on fdsnws.

Best Regards

We close this ticket. If there is still an problem please reopen the ticket

BMKG - TsunAWI - Question #6216

Rsync command/manual

11/13/2024 10:14 AM - Yedi Dermadi

Status:	Closed	**Due date:**	
Priority:	trivial	**% Done:**	100%
Assignee:	Yedi Dermadi	**Estimated time:**	0:00 hour
Category:		**Spent time:**	0:30 hour
Internal Assignee:	Ralph Henneberger	**Locked by:**	

Description

Dear Ralph,

Just to remind you, could you please send the manual/steps to do the data products synchronization from tsundabi (geof.bmkg.go.id) to proc1 (for TOAST Jakarta) and to bali_acqui2 (for TOAST Bali) when the new TsunAWI scenarios has been added on tsundabi (geof.bmkg.go.id). Thanks very much.

Regards,

History

#1 - 11/13/2024 07:28 PM - Thomas Bornstein

- Internal Assignee Ralph Henneberger added

#2 - 11/18/2024 01:45 PM - Support Team

- Priority changed from standard to major

Hi Yedi,

thanks for the kindly reminder. Ralph will provide the steps this week.

Enrico

#3 - 11/26/2024 03:36 PM - Support Team

- Status changed from New to Feedback

- Assignee changed from Support Team to Yedi Dermadi

- Priority changed from major to trivial

- % Done changed from 0 to 100

Hello Yedi,

Be sure to check the rights and adjust them if necessary after and before the rsync!!!
Make a backup first, see below!!!

```
bali_acqui2:

as sysop:

cd /home/data
tar cvfz dataproducts.2024.10.31.tar.gz dataproducts
rsync -avz root@202.90.198.101:/home/data/dataproducts .

as root:

cd /var/www/tsundabi/htdocs
tar cvfz dataproducts.2024.10.31.tar.gz dataproducts
rsync -avz root@202.90.198.101:/var/www/tsundabi/htdocs/dataproducts .

proc1 jakarta

as root:

cd /home/data
```

```
tar cvfz dataproducts.2024.10.31.tar.gz dataproducts
rsync -avz root@202.90.198.101:/home/data/dataproducts .

cd /usr/share/nginx/html/tsundabi
tar cvfz dataproducts.2024.10.31.tar.gz dataproducts
rsync -avz root@202.90.198.101:/var/www/tsundabi/htdocs/dataproducts .
```

#4 - 12/05/2024 02:19 PM - Support Team

Hi Yedi,

can we close this ticket or do you need more information?

Enrico

#5 - 12/05/2024 03:08 PM - Yedi Dermadi

- Status changed from Feedback to Closed

Hi Enrico,

Yes, we can close the ticket.

Regards,

gempa

On-Site Corrective Maintenance

January - December

2024

International expert visits to support the national earthquake monitoring and tsunami early warning system, ensuring stable and reliable operation.

Maintenance Trip 2024 - February

As a critical note, it must be reiterated that RHEL 7 will reach its end of life (EOL) on June 30, 2024. Consequently, we will discontinue offering packages for it beyond a certain point, resulting in no further SeisComP or gempa bug fixes and enhancements for RHEL 7.

To facilitate testing, the new TOAST version should be concurrently installed on an (old) PC in LT3.

We use SeisComP6 for all server/workstations, which will updated.

Preparations:

All clients and servers in Bali and Jakarta must undergo migration to Ubuntu 22.04. gempa advises installing Ubuntu 22.04 on the new Jakarta machines now for preliminary testing. Fresh installations will be performed on all other computers during the trip. These machines can be prepared and tested before gempa's staff arrive in Jakarta (IP 192.168.88.140 - sysop@new-sc-gui-prod / IP 192.168.88.141 - sysop@new-sc-backup / IP 192.168.88.142 - sysop@new-toast-backup / proc1 server).

In Jakarta from February 10, 2024, to February 16, 2024:

Switch the following computers to Ubuntu:

```
geof.bmkg.go.id
lts-data
proc1/proc2
acqui (may remain CentOS 7, as only SeedLink)
All GUIs
```

Saturday – 10.02.2024 and Sunday – 11.02.2024

Kick-off meeting with Mr. Yedi to talk about what we will be doing during the next 2 weeks. The main reason for the trip is to install Ubuntu 22.04 and SeisComP6 on all GUI and server systems except the acquisition systems. In addition we install components on a new system which are part of the Tsunami Risk project.

Test pre-installed system

- Test new systems
  - sc-gui (New pc / Ubuntu 22.04 / SeisComP 6)
  - toast (New pc / Ubuntu 22.04 / SeisComP 6)
  - sc-gui-lt3 (New pc / Ubuntu 22.04/ SeisComP 6)
  - proc1 (New server / Ubuntu 22.04/ SeisComP 6)

Upgrade in 3rd floor

•Migrate proc2 to Ubuntu22.04. After migrating the server to Ubuntu 22.04,

```
install SeisComP6.
  •Migrate the toast-backup to Ubuntu22.04, install SeisComP6/Toast.
  •Replace the old sc-gui-prod workstation with the new sc-gui-prod
workstation.
```

!!! Please be aware that we need the networking team, to make sure the port at the BMKG switch is not blocked after migrate Ubuntu22.04 !!!

```
  •Test the setup on the third floor.
  •When the test was successfully. Start upgrade in 2nd floor.
```

Monday – 12.02.2024

2nd floor

```
  •Replace the sc-gui with the new workstation
  •Replace the toast with the new workstation
  •Replace proc1 with the new server
  •Concurrently, install Ubuntu22.04 on the GUI machines sc-gts and sc-wall.
And install SeisComP6.
  •Test the entire system again for full functionality.
```

—

```
  •Concurrently migrate old Toast-Workstation(lt2) to Ubuntu22.04 and setup
SeisComP6/Toast.
```

—

If the test on the second floor is successful, proceed to the third floor.

Tuesday – 13.02.2024

Continue in 3rd floor

```
  •Exchange the Toast-Workstation(lt3) with the Toast-Workstation(lt2).
  •Test the system on lt3 again.
  •Use the old Toast-Workstation(lt3) to install the newester Toast version.
This machine can be used by BMKG to test the client-server version of Toast.
```

Wednesday – 14.02.2024

```
  •Migrate lts-data to Ubuntu22.04, install SeisComP6.
  •Migrate geof.bmkg.go.id to Ubuntu22.04, install SeisComP6. (contact
Andres for support on webdc3 setup).
```

Thursday – 15.02.2024

- Nagios
- Spare day / Free for open issue

Friday – 16.02.2024

- Tsunami Risk presentation together with Bernd
- Free for open issue
- Flight to Bali

BALI

Saturday – 17.02.2024

- proc2
- eventview (update from Ubuntu 20.04 to 22.04)
- traceview (update from Ubuntu 20.04 to 22.04)
- scqcv (update from Ubuntu 20.04 to 22.04)

Sunday – 18.02.2024

- proc1
- sc-gui
- toast

Monday – 19.02.2024

- acqui1
- acqui2

Tuesday – 20.02.2024

- Testing the whole system

Wednesday – 21.02.2024

- Nagios
- Spare day / Free for open issue

BMKG Maintenance Trip 10/2024

gempa GmbH

January 23, 2025

1 Monday - 28.10.2024

Today the focus lies on the update of the Tsunami Early Warning backup system located at the 3rd floor. The work included the following systems:

- SeisComP GUI system (sc-gui-lt3)
- TOAST GUI system (toast-lt3)
- TOAST test system
- Backup processing system (proc-lt3)

1.1 Meeting with BMKG

Kick-off meeting with Direkurat gempa bumi dan tsunami (Mr. Yedi, ...) and we talked about what is planned for this maintenance trip. The following topics were discussed:

- Meeting started delayed because of an official ceremony at the BMKG. We had to wait for some participants.
- Mr. Yedi started the meeting and gave an introduction about what should be done during the next days in Bahasa Indonesia
- Together with Mr. Yedi we went through the schedule
- We confirmed that we install SeisComP version 6.5.1 on the systems
- During the update on Wednesday the operators will use the backup system at the third floor
- We confirmed that we had to fly on Friday to Bali since we have already booked the hotel for Bali LTS data
  - Mr. Wolfgang explained more in detail what is the idea with the Bali event archive on LTS data
  - Mr. Yedi noted the new LTS data has a private IP only at the moment.
  - A public IP must be requested from the network team
  - We confirmed that the sync between the old and new system is still ongoing because of the huge archive. The copy process started 2 weeks ago and up to now around 50 percent have been finished.

  New TOAST system

  - Talked about if the provided graphic card NVIDIA A2000 is sufficient for the server. We explained that the card has around 3000 CUDA cores whereas the client systems have cards with 10000 cores or more. We agreed that the A2000 card is sufficient for the first testing.
  - Explained that the new TOAST system and the lt2 system should run in parallel at the warning room so that the results could be compared easily.
- BMKG requested an extra session about what have been change from 6.3.1 to 6.5.1 during the training the next week.

- Mr. Yedi showed a check list of tasks proposed in the schedule and new tasks. Some of the tasks are written in Bahasa Indonesia only.
- Some of the meeting participants asked questions.
- TsunAWI
  - BMKG asked how they can synchronize the different installations
  - We told them that it is enough to keep the TsunAWI installation in sync
  - We also agreed to provide all required sync steps via email within the next days

1.2 TOAST test system

The system consists of the following components:

- TOAST client
- TOAST server

Initially we had the plan to install the client and server components on the same system where each installation has its own directory. Shortly before our departure to Indonesia BMKG decided to provide a new server for the server part of the installation. The system already had Ubuntu 22.04 as operating system pre-installed.

1.2.1 TOAST server - 192.168.88.140

The provided server has the following specifications:

- Intel(R) Xeon(R) Silver 4410Y 48 cores
- 64 GB Ram
- NVIDIA RTX A2000 12 GB graphic card (3328 CUDA cores)
- 1TB storage

The A2000 graphic card is from 2021 and has fewer CUDA cores than the one used in the TOAST desktops. Due to reason this the EasyWave2 computation may take longer on this system.

Installation steps:

- Ubuntu system update
- Installed required SeisComP and gempa dependencies, e.g., boost or qt5
- Installed gsm via Git remote
- Created a MySQL datase for toastd and gss
  - Restored toastd(tews) and gss database from client system
  - Tried to apply the database migration scripts but some of them failed
  - Fixed some of the TOAST database migration scripts
- Installed required data products

```
sysop@multi-toast-server:~$ cd install/gsm
sysop@multi-toast-server:~$ gsm reinstall bathymetry forecastzones-bmkg forecastzones-rtsp
    sourceregions
```

- Added required environment variables to */home/sysop/.bashrc*, e.g., SeisComP variables

- Setup Git aliases
- Added required hostnames to */etc/hosts* file

```
192.168.88.250 ntp0.tews
192.168.88.251 ntp1.tews172.19.3.73 smsauto.bmkg.go.id #automatic eq event sms 1
172.19.3.66 tspweb.bmkg.go.id #rtsp website
172.19.3.11 smsauto2.bmkg.go.id #automatic eq event sms 2
172.19.1.44 dsmgui2.bmkg.go.id #dissemination machine2
172.19.1.40 jktacq.bmkg.go.id #eq data exchange
172.19.3.78 tdur.bmkg.go.id #tsunami potential calculation
172.19.3.51 repo1.bmkg.go.id #eq data repository 1
172.19.3.52 repo2.bmkg.go.id #eq data repository 2
172.19.3.53 repo3.bmkg.go.id #eq data repository 3
172.19.3.54 repo4.bmkg.go.id #eq data repository 4
172.19.3.63 ggdsmgui.bmkg.go.id #dissemination machine1
202.90.198.41 ev2web.bmkg.go.id #event update from sc3 to web192.168.88.52 proc proc.tews
    tsunawi.tews
172.19.2.115 lts-data lts-data-jkt
```

- Added local NTP server to */etc/systemd/timesyncd.conf* file
- Checked SC messaging connection of TOASTD
- Enabled scmaster and gss service
- Adapted TOASTD configuration, e.g., changed database from tews to toast
- Created a new commit and uploaded the changes into the new branch toast-server-jakarta
- Updated packages via gsm to include latest TsunAWI hot fix
- Created a new commit and uploaded the changes into the Git
- Restarted all SeisComP services
- We noticed that the gss could not be started after the update since the TsunAWI plugin linked against the wrong library. It turned out that the plugin build description was not up to date. We adapted the description, built the plugin manually and reinstalled it.
- Restarted all SeisComP services again

1.2.2 TOAST client - 192.168.88.141

- Team Anomalie installed the operating system on the system
- Did basic gempa GUI installation, e.g., installed base libraries or setup core dumps used to track segfaults
- Ubuntu system update
- Installed gsm system dependencies
- Installed additional required SeisComP dependencies
- Fetched TOAST client installation from Git. This has been prepared based on the configuration of the TOAST test system located at the 3rd floor
- Initial testing of the system

1.3 TOAST GUI system - 172.19.3.90

- System update
- Noticed that the fan had some issues logged in boot screen
  - Had some issue to apply the software updates
  - As a workaround we had to reinstall the xorg-server core package. Then we could to finalize the update operation.
  - Rebooted the system to take updates and security fixes into account
- Checked the installation */home/sysop/seiscomp* for local changes. No files were changed.
- Updated and installed packages with gsm
- Applied all changes made by the update to the Git
- Executed the TOAST dependency script to install required dependencies, e.g., **libQt5WebEngineWidgets.so.5**
- Tested the installation after the update
- Pt. Anomali requested to replace this system with the toast-demo (172.19.3.210) system
- We created a backup of the home directory so that we can restore the data on the new system
- Switched to new system

1.3.1 TOAST GUI new hardware - 172.19.3.210

- System update
- Rebooted the system to take updates and security fixes into account
- Copied the backup from the TOAST GUI to this system
- Restored required files from backup, e.g., SSH authorized keys required for the dissemination system
- Fetched latest changes from Git and updated gui-stable branch
- Executed all dependency scripts to install new dependencies
- Changed configuration to use the new geof system for requesting TsunAWI simulations
- Set IP of the system to 172.19.3.90
- Tested the installation after the update

1.4 SeisComP GUI system - 172.19.1.82

- System update
- Rebooted the system to take updates and security fixes into account
- Checked the installation */home/sysop/seiscomp* for local changes. In the scolv configuration file the GNSS stations have been removed from inventory blacklist.
- Fetched latest changes from GIT and updated gui-stable branch
- Executed all dependency scripts to install new dependencies
- Started scvoice
- Tested the installation after the update
  - Checked waveform data with the scrttv
  - Loaded waveform data and event in scolv
  - Checked the event summary and map view

1.5 Backup processing system - 172.19.3.69

- System update
- Rebooted the system to take updates and security fixes into account
- Checked the installation */home/sysop/seiscomp* for local changes. The following local changes were detected:
  - Modified and new station key files
  - scimex import and export have been removed from auto start
  - MT license update
- Created single commits for the local changes and uploaded changes to remote
- Checked running modules

```
sysop@proc2:~$ seiscomp status enabled
/home/sysop/seiscomp/etc/init/sc2ql_bmkg.py:1: DeprecationWarning: The SeisComP3 python API compatibility
  import seiscomp3.Kernel, sys
scmaster              is running
caps                  is running
caps2caps             is running
fdsnws                is running
gdisp                 is running
ql2ql_pdb             is running
ql2ql_sds             is running
ql2sc                 is running
quakelink             is running
rs2caps-ioc           is running
sc2ql                 is running
scamp                 is running
scautoloc             is running
scautomt              is running
scautomtlight         is running
scautopick            is running
scevent               is running
scevtlog              is running
scmag                 is running
scqc                  is running
scsohlog              is running
scwfas                is running
seedlink              is running
slarchive             is running
Summary: 24 modules enabled
```

- Run gsm update to fetch and install latest package updates
- Restarted and checked all SeisComP services
- Run https://data.gempa.de/packages/Public/tools/gempa-checkSCconfig.py script to check if the configuration needs to be migrated. There was no need to migrate the configuration.
- Tested the system
  - The system received new events after the update
  - The clients received near realtime seismic data after the update
- Removed outdated core dumps from system

1.6 Testing

Mr. Yedi and team tested the backup system in the afternoon. They did serveral test like

- Modified an existing origins and committed the changes via scolv
- Sent the updates to TOAST by fixing solutions
- Computed simulations
- Disseminated products via TOAST
- Checked the internal web page and if the results match the expectations

Until the end of the day no issues have been noticed by them.

2 Tuesday - 29.10.2024

- Today we got the information that we have to reschedule the update of the main processing system tomorrow since BMKG has an excerise in the warning room from 9 to 11 AM in the morning.
- Mr. Wolfgang created and updated data flow diagrams

2.1 Backup processing system - 172.19.3.69

- Checked detected earthquakes of the last 8 hours
- The system detected earthquakes and the eq data exchange between the primary system is working
- Compared the results of the primary and backup system with scolv
- Results of the backup system:

```
# python3 eventlst.py -d 172.19.3.69 --begin "2024-10-28 16:00:00"
bmg2024vfft 4.14 A M 2024-10-28 16:50:27 BMKG
bmg2024vfmx 3.01 M M 2024-10-28 20:26:56 BMKG
bmg2024vfrb 5.26 A M 2024-10-28 22:34:00 BMKG
bmg2024vfsn 2.74 M M 2024-10-28 23:17:06 BMKG
bmg2024vfsw 3.29 M M 2024-10-28 23:28:06 BMKG
bmg2024vfsy 3.56 M M 2024-10-28 23:30:34 BMKG
bmg2024vfta 2.60 M M 2024-10-28 23:32:09 BMKG
bmg2024vftb 2.67 M M 2024-10-28 23:33:50 BMKG
bmg2024vftc 3.40 A M 2024-10-28 23:35:21 BMKG
bmg2024vfyb 3.70 A M 2024-10-29 02:05:10 BMKG
```

- Results of the primary system:

```
bmg2024vfft 3.89 A M 2024-10-28 16:50:27 BMKG
bmg2024vfmx 3.01 M M 2024-10-28 20:26:56 BMKG
bmg2024vfrc 5.26 A M 2024-10-28 22:34:00 BMKG
bmg2024vfsn 2.74 M M 2024-10-28 23:17:06 BMKG
bmg2024vfsw 3.29 M M 2024-10-28 23:28:06 BMKG
bmg2024vfsy 3.56 M M 2024-10-28 23:30:34 BMKG
bmg2024vfta 2.60 M M 2024-10-28 23:32:09 BMKG
bmg2024vftb 2.68 M M 2024-10-28 23:33:50 BMKG
bmg2024vftc 3.40 M M 2024-10-28 23:35:21 BMKG
bmg2024vfyb 3.70 A M 2024-10-29 02:05:10 BMKG
```

- Both systems detected the same earthquakes. But it looks like the backup system recogniezes more events automatically.
- Over the day further earthquake were detected and singalled by scvoice
- Removed no longer used *sc2ql_bmkg.py* init file from installation

2.1.1 TOAST server - 192.168.88.140

Yesterday we noticed that the TOAST server database did not store simulation estimations when running TsunAWI simulations. Today we spent some time to analyze the issue.

1. Created sample TsunAWI simulation request and send it via telnet API to the simulation server

   ```
   #cat test.req

   POST REQUEST 270
   {"SimulationRequest":{"backend":"TsunAWI","backendMinorVersion":1,"backendMajorVersion
       ":0,"backendRevision":0,"id":"1e653338","mag":8,"depth":10.019299999999999,"lat":-3.18
        ,"lon":100.53,"originTime":"2023-07-19T12:28:45.0000Z","created":"2023-07-24T11
       :36:55.280408Z"}}


   cat test.req | nc localhost 19010
   ```

2. Checked the server response. Status was updated from **Running** to **Finished**

From the response we could see that the status is updated as expected. Looks like the behavior is releated to the toastd implementation. We have to get in touch with developer team to talk about how we can solve the issue.

2.1.2 TOAST client - 192.168.88.141

In the afternoon BMKG started to test the TOAST client and server system. They noted the following points:

- Tsunawi matching: For some locations and big magnitudes, e.g., 9.5 the system returned no results. We have crossed-check this with the operational system and it was the same behavior. Talked with Mr. Iman about that and he explained that the magnitude difference is too big.
- Geotiff script missing on the TOAST client system
- Size of the forecast zones output differs

We agreed to check the observed points and provide feedback within the next days.

2.2 New geof - 202.90.198.101

2.2.1 DokuWiki

Some features of the DokuWiki, e.g., the station tables did not work anymore for some time now. This is no new issue and was already reported on the old system. We spent some time on the issue and we figured out that some datatable filter settings broke the pages. The debug process involved the following steps:

- Checked Apache web server log files
- Compared working with a broken pages
- Copied the filter settings of working pages
- Applied working filters to a broken page

- Reduced the content of broken pages until it could be loaded successully

We also noted that the maximum execution for PHP code was set to 30 seconds which caused issue with larger content. Due to this reason we changed the PHP configuration of the 8.1.3 to fit better the new requirements. To apply the changes we had to restart the Apache web server.
As we did not mangage to get all filter queries working where the filter string "filteror" were used we decided together to split up the tables with Mr. Wolfgang. That means that there is a table for each each status in future. Mr. Wolfgang migrated the wiki pages to the new layout.

2.2.2 SeedLink

- Updated SeisComP installation to 6.5.1
- Created a new Git commit for the changes and uploaded it to the remote
- Restarted the SeedLink service
- Checked that seismic data is incoming

2.2.3 WebDC3

After the installation in February 2024 some of the functionality of the WebDC3 web interface was broken since the source code was not compatible with Python3. Python2 support is no longer availabe for Ubuntu 22.04 and the code must be migrated to Python3.

- Checked the status of the WebDC3 installation
- Mr. Wolfgang and we noticed that some requests are not working
  - Explore Station —> BH –> search –> View Console ()

    Meta data Query faild

- We did the following steps to fix the issues
  - Adapted Apache2 configuration so that it points to the fdsnws installation of the lts-data system instead of localhost
  - Setup Git to monitor the WebDC3 installation
  - Even with the changed configuration the web interface was not working since there were some Python related errors in the web server log

    ```
    # less /var/log/apache2/geof.bmkg.go.id.log
    [Tue Oct 22 13:08:32.357317 2024] [wsgi:error] [pid 925640] [client
        139.17.75.55:37188]   File "/var/www/html/webdc3/wsgi/inventorycache.py", line
        855, in __buildStreamsList, referer: https://geof.bmkg.go.id/webdc3/
    [Tue Oct 22 13:08:32.357324 2024] [wsgi:error] [pid 925640] [client
        139.17.75.55:37188]     (loc_ch, restr) = zip(*sorted(zip(loc_ch, restr))) or
        ([], []), referer: https://geof.bmkg.go.id/webdc3/
    [Tue Oct 22 13:08:32.357353 2024] [wsgi:error] [pid 925640] [client
        139.17.75.55:37188] ValueError: not enough values to unpack (expected 2, got 0),
        referer: https://geof.bmkg.go.id/webdc3/
    ```

  - Got several times in touch with Mr. Andres from GFZ to find a solution. It turned out that the WebDC3 web interface was not ported fully to Python3 which caused the issues. Mr. Andres adapted the code on the new geof system to solve the problems.
  - Mr. Wolfgang did a final test after all changes were applied.

2.3 LTS data

This system is the long term storage for waveform and earthquake data. During the last maintenance trip in February 2024 we switched most of the systems to Ubuntu 22.04 since CentOS 7 became EOL this year. We could not install the new operating system on LTS data because we had no backup system. Due to this reason we requested a new virtual machine hosted at the data center which has enough capacity to hold the data. The following tasks were performed:

- Setup a virtual machine (BMKG)
- Installation of all required services
- Synced waveform and earthquake archive to the new system

2.4 Virtual machine

The virtual machine has been provided by the data center of the BMKG a few weeks before the maintenance trip started. The machine uses Ubuntu 22.04. The login credentials was provided by email.

2.5 Data sync

- Copied gsm installation from lts-data and migrated the configuration
- Copied the SeisComP installation from lts-data
- Installed new software depenendy required for gsm and SeisComP
- Migrated installation from CentOS 7 to Ubunut 22.04
- Started rysnc from lts-data to the new lts-data in screen.

2.5.1 QuakeLink Bali

Some time ago we got a request from Mr. Dwi where he wanted to have access to earthquake data from 2020 which have been analyzed by the Bali system only. This is currently not so easy since the LTS data holds both the solutions from Jakarta and Bali. That's why we came to the decision to keep the Bali solutions separately.

- Setup new QuakeLink instance for Bali data only

3 Wednesday - 30.10.2024

The focus lied on the update of the operational system at the second floor. Unfortunately the update could not be started in the morning as planned since the BMKG did a Pacific Tsunami Early Warning exersise with the operational system. During the excersize we focused on open issues of the last days.

3.1 TOAST server - 192.168.88.140

Mr. Yedi told us yesterday that the forecast zone bulletin looks different to the operational TOAST system:

1. Map size is different
2. Forecast legend contains additional entry

We compared the templates of both systems and they were slightly different. The main differences were because of some syntax changes required for the old TOAST software. In addition we noticed that the BMKG RTSP template of the operational system exports the arrival times as JSON. In addition we also compared the used map styles file and the gradient definitions looked slightly different too. We did the following actions on the TOAST client and server system:

- Removed entry "Tdk ada ancama" from ForecastZonesNTWCGrad gradient from mapstyles
- Added arrival line export to BMKG RTSP template
- Applied all changes made to Git
- Asked Mr. Yedi to test again.

From the template definitions we could not figure out why the forecast zone image should have a different size. Maybe the different size is caused by some code changes. We have to get in touch with the dev team to talk about that.

3.2 New geof - 202.90.198.104

Mr. Yedi tested yesterday evening the new geof system. He told us that everything is ok except that he could access DokuWiki data even he was not logged in. We checked this in the morning and it turned out that some access settings were lost during setup. We recovered the settings and checked that DokuWiki access is protected by password again.

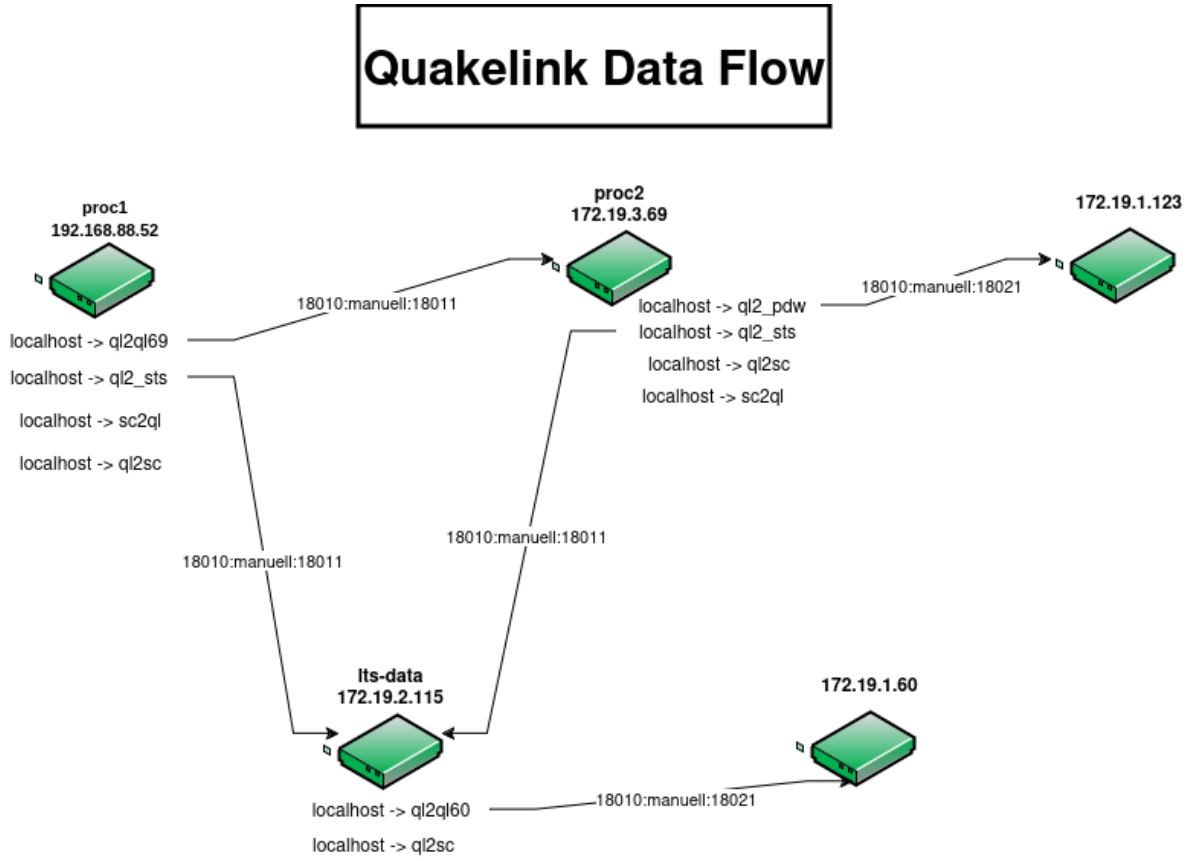
3.3 Backup processing system - 172.19.3.69

Setup scanloc for local earthquake processing.

- Fixed broken gsm installation after previous update. Some additional deps needed to be installed.
- Installed scanloc via gsm
- Deployed scanloc configuration prepared already in Germany
- Discussed with Mr. Wolfgang about which stations should be taken into account. He told us that Mr. Iman provides a station list.
- Committed the pre setup changes and uploaded the it to Git
- Requested station list from Mr. Iman

3.4 EQ data flow

Together with Mr. Wolfgang we checked the QL setups of proc1, proc2 and lts-data. All systems exchange manual solutionsonly. We created a drawing of the data flows between the systems to have a better overview which systems are involved.



!!! Only Manuall QL Solutions are exchanged on all Servers !!!.

BMKG asked why event **bmg2024utyp** has a different preferred magnitude on proc1 and lts-data(M vs. Mw). We did the following steps to analyze the issue:

- Checked the scevent processing log and found the following entry:

  ```
  Origin Origin/20241022125456.150548.173841 has not been set preferred in event bmg2024utyp: status priorit
  ```

  This message could be an indication why the Mw magnitude was not set preferred.

- Checked the scevent configuration of lts data. Mw is the first magnitude on the configuration option *eventAssociation.magTypes* list which is correct since Mw should be set preferred if available

- Got in touch with the gempa support to asked for help. Unfortunately we could not solve the issue and we decided to postpone it after we are back in the office.

3.5 Main system update

Due to the Pacific Ocean Wave 24(PACWAVE 24) excerise at the warning room the update process started around noon.

3.5.1 sc-mt - 192.168.88.162

- Checked installation for local changes. The scolv configuration has been modified as follows:

  ```
  +# Minimum depth which is set if the locator used supports fixing the depth. If
  +# the depth is lower than this value, the depth is fixed to this configured
  +# value and the origin is relocated again.
  +olv.locator.minimumDepth = 5
  ```

- Kept the local changes
- Fetched latest installation from Git
- Logged in as root and installed new software dependencies
  - Could not install the TOAST deps since some unmet dependencies
  - Did apt –fix-broken install to fix the issue
  - Run apt update to install latest packages
  - Freed some space on the root partition
  - Finally installed some packages step by step to solve the issue
- Did some basic tests with TOAST, scmtv and scolv -> OK

3.5.2 toast-new - 192.168.88.46

- Checked installation for local changes. No local changes were found.
- Fetched latest installation from Git
- Logged in as root and installed new software dependencies
- Did some basic tests with TOAST and scolv -> OK

3.5.3 sc-gui-prod-new - 192.168.88.43

- Checked installation for local changes. For scesv and scolv the logging level were set to verbose. This seems to be a change from a previous maintenance trip and is no longer needed. Reset the changes.
- Noticed that we have no access to the Git anymore. This happened because they switched to the new geof system while we did the update. Further action was required before we could continue with the update.
- Fetched latest installation from Git
- Logged in as root and installed new software dependencies
- Restarted scvoice module
- Did some basic tests with scolv

3.5.4 sc-wall - 192.168.88.42

- Checked installation for local changes. No local changes were found.
- Fetched latest installation from Git
- Updated gui-stable-wall branch
- Did some basic tests with the scmv

3.5.5 sc-proc1 - 192.168.88.52

- Checked installation for local changes. The following changes were found
  - MT license update
  - Inventory and key files changes
  - Disabled scimex_export module
- The updated process stucked at some point because there was some background copy operation that eated up all IO performance.
- Running modules before the update

```
scmaster                is running
caps                    is running
caps2caps               is running
fdsnws                  is running
gdisp                   is running
ql2ql69                 is running
ql2ql_sds               is running
ql2sc                   is running
quakelink               is running
rs2caps-ioc             is running
sc2ql                   is running
scamp                   is running
scautoloc               is running
scautomt                is running
scautomtlight           is running
scautopick              is running
scevent                 is running
scevtlog                is running
scimex_import           is running
scmag                   is running
scqc                    is running
scsohlog                is running
scwfas                  is running
seedlink                is running
slarchive               is running
```

- Did gsm update
- Loaded the changes into Git
- Restarted all SeisComP services
- Checked that realtime data is incoming
- Requested to restart all GUIs at the warning room
- Removed no longer needed *sc2ql_bmkg.py* init file from installation

4 Thursday - 31.10.2024

4.1 Main processing system - 192.168.88.52

- Checked detected earthquakes of the last 8 hours

- The system detected earthquakes and the eq data exchange with the backup system is working
- Compared the results of the primary and backup system with scolv
- Results of the main system:

```
# python3 eventlst.py -d 192.168.88.52 --begin "2024-10-30 16:00:00"
bmg2024viwe 4.38 A M 2024-10-30 16:32:49 BMKG
bmg2024vize 3.23 M M 2024-10-30 18:04:06 BMKG
bmg2024vjdn 5.87 A M 2024-10-30 20:15:28 BMKG
bmg2024vjgh 4.89 A M 2024-10-30 21:39:15 BMKG
bmg2024vjie 3.97 A M 2024-10-30 22:36:21 BMKG
bmg2024vjkn 4.62 A M 2024-10-30 23:47:25 BMKG
```

- Results of the backup system:

```
#python3 eventlst.py -d 172.19.3.69 --begin "2024-10-30 16:00:00"
bmg2024viwe 4.47 A M 2024-10-30 16:32:49 BMKG
bmg2024vize 3.23 M M 2024-10-30 18:04:06 BMKG
bmg2024vjdn 5.87 A M 2024-10-30 20:15:28 BMKG
bmg2024vjgh 4.88 A M 2024-10-30 21:39:15 BMKG
bmg2024vjie 3.97 M M 2024-10-30 22:36:21 BMKG
bmg2024vjkn 4.61 A M 2024-10-30 23:47:25 BMKG
```

- Both systems detected the same earthquakes but some magnitudes were slightly different. This needs further investigation when we are back in the office. Added this point to the open point list.
- We asked Mr. Yedi whether he has received any complains from the operators after update. He told us that everything works well.

4.2 TOAST client - 192.168.88.141

The following issues were noticed:

- The operators noticed that TOAST operational and client computes different simulations. We checked the issue on the TOAST client system since we could there easily the history via the incident log. It turned out the magnitude changed slightly from 7.11 to 7.16 which should trigger no new simulation because the magnitude difference is too small. We forwarded this information to the TOAST dev team.
- The scmaster log file of the TOAST server containd several database releated errors. We forwarded this information to the TOAST dev team and switched the backend from MySQL to PostgreSQL which solved the issue.
- Licsar2caps was not running. Enabled and restarted the module. In addition adapted the licsar storage location in the TOAST client config to */home/data/licsar*

4.3 Backup processing system - 172.19.3.69

Continued scanloc configuration. Unfortunately Mr. Iman could not provide a station list for local processing. Due to this reason we decided to go with all IA stations for the beginning.

- Fixed ap_local configuration (Copied cfg file to right location)
- Started scconfig and applied ap_local profile to the whole IA network
- Saved the changes and updated the SC configuration
- Enabled and started the modules ap_local and scanloc
- Documented and uploaded the changes to Git
- Waited for a new event. The next detected event had scautoloc and scanloc solutions -> The setup works.

4.4 LTS data - 172.19.2.115

- Mr. Wolgang together with team Anomalie coordinated the IP change with the data center
- We requested that the old system should be online too so that we could copy missing data when required
- The data center set the IPs
- We also installed an LAN cable from server to server and set private IPs. We now avoid to send the data over the busy switch and hopefully get an higher data rate to copy the 60TB data archive. The network administration was done by Mr. Yedi because he has root access only.

4.5 New geof - 202.90.198.101

Mr. Yedi noted that some of the users cannot login into the DokuWiki. Mr. Wolfgang checked the DokuWiki settings and it turned out that some user attributes were set properly. With the settings in place admin users could access the wiki only therefore this was not noticed during initial testing. They have solved the problem by giving the users read permissions.

5 Friday - 01.11.2024

- Nagios Maintenance
- Booked flights for Bali
- Provided remote access to the backup systems for Mr. Wolfgang
- Compared the detected events of the night
  - Backup processing system

```
# python3 eventlst.py -d 172.19.3.69 --begin "2024-10-31 16:00:00"
bmg2024vkrf 5.09 A M 2024-10-31 16:18:20 BMKG
bmg2024vksm 2.52 A M 2024-10-31 16:56:55 BMKG
bmg2024vktm 3.53 A M 2024-10-31 17:26:53 BMKG
bmg2024vkuc 5.29 A M 2024-10-31 17:46:30 BMKG
bmg2024vkue 4.52 A M 2024-10-31 17:48:02 BMKG
bmg2024vkvb 3.18 A A 2024-10-31 18:15:35 BMKG2
bmg2024vkvz - M M 2024-10-31 18:43:30 BMKG
bmg2024vkxy 4.46 A M 2024-10-31 19:42:18 BMKG
bmg2024vkza 3.14 A M 2024-10-31 20:14:45 BMKG
bmg2024vkzf 4.73 A M 2024-10-31 20:20:47 BMKG
bmg2024vlag 5.41 A A 2024-10-31 20:52:00 BMKG2
bmg2024vlca 3.55 A A 2024-10-31 21:45:34 BMKG2
bmg2024vldx 2.95 A M 2024-10-31 22:42:42 BMKG
bmg2024vlfd 3.08 M M 2024-10-31 23:20:35 BMKG
```

  - Main processing system

```
bmg2024vkrf 5.24 A M 2024-10-31 16:18:20 BMKG
bmg2024vksm 2.46 M M 2024-10-31 16:56:55 BMKG
bmg2024vktm 3.46 M M 2024-10-31 17:26:53 BMKG
bmg2024vkuc 5.43 A M 2024-10-31 17:46:30 BMKG
bmg2024vkue 4.55 A M 2024-10-31 17:48:02 BMKG
bmg2024vkvz 2.72 M M 2024-10-31 18:43:30 BMKG
bmg2024vkxy 4.45 A M 2024-10-31 19:42:18 BMKG
bmg2024vkza 3.14 M M 2024-10-31 20:14:45 BMKG
bmg2024vkzf 4.73 A M 2024-10-31 20:20:47 BMKG
```

```
bmg2024vlag  5.33  A A 2024-10-31 20:52:00 BMKG1
bmg2024vldx  2.95  M M 2024-10-31 22:42:42 BMKG
bmg2024vlfd  3.08  M M 2024-10-31 23:20:35 BMKG
```

- The results show that the backup processing system detected 2 more events due to the new scanloc setup. The initial origins were formed by scanloc. When comparing the results between the main and the backup system it stands out that the mangitude values are slighlty different and in case of a manual solution the magnitude was not set preferred on the backup system. This differences must be discussesd with team when we are back in the office.

```
2024/10/31 19:04:13 [processing/info/SCEVENT] Origin Origin
    /20241031190405.191297.149429 created a new event bmg2024vkvz
2024/10/31 19:04:13 [processing/info/SCEVENT] Origin Origin
    /20241031190405.191297.149429 associated to event bmg2024vkvz
2024/10/31 19:04:13 [processing/info/SCEVENT] Origin Origin
    /20241031190405.191297.149429 has been set preferred in event bmg2024vkvz
2024/10/31 19:04:13 [processing/info/SCEVENT] Event bmg2024vkvz got new region name:
    Near North Coast of West Papua
2024/10/31 19:04:13 [processing/info/SCEVENT] Received new magnitude Magnitude
    /20241031190409.481026.149441 (Mjma 2.86)
2024/10/31 19:04:13 [processing/info/SCEVENT] Received new magnitude Magnitude
    /20241031190409.481749.149445 (MLv 2.65)
2024/10/31 19:04:13 [processing/info/SCEVENT] Received new magnitude Origin
    /20241031190405.191297.149429/netMag/M (M 2.72)
2024/10/31 19:04:13 [processing/info/SCEVENT] Received new magnitude Origin
    /20241031190405.191297.149429/netMag/MLv (MLv 2.65)
2024/10/31 19:04:13 [processing/info/SCEVENT] Received new magnitude Origin
    /20241031190405.191297.149429/netMag/Mjma (Mjma 2.85)
2024/10/31 19:04:13 [processing/info/SCEVENT] Received new magnitude Origin
    /20241031190405.191297.149429/netMag/M (M 2.72)
```

- Fixed the core dump setup of the backup processing system
- Mr. Wolfgang added the data flow graphs to the BMKG support wiki
- Last meeting with Mr. Yedi
  - Went together through the schedule
  - The missing timestamp of the TOAST NTWC product is still an issue
  - Talked about the days in Bali
  - Talked about the new hard disks and the problem with the integration into proc1
  - Noted again how important it is to create tickets in the gempa support portal
- Team Anomalie restarted the TOAST systems at the 2 floor. After the restart the nework configuration of the toast client system was lost. After a while they fixed the broken network settings.
- Noted that all GUIs are restarted every Friday
- Provided updated version of the *record-file-stat.py* script to Mr.Yedi because the existing one on lts data still used old SeisComP imports

5.1 Hard disk installation

During the meeting on Monday BMKG requested to setup additional hard disks on the main and backup processing system. It was not entirely clear at first what should be done with the hard disks. We thought at first they should be used as spare disks but Mr. Yedi yesterday explained that the TsunAWI simulation data should be stored in the future on the disks because they do not have enough free space on the existing hardware RAID for upcoing scenarios. We suggested to use a software RAID for the disk since it is easy to setup and the system needs no restart.

5.1.1 Backup processing system - 172.19.3.69

- Team Anomalie has installed the hards disks in the server
- Setup software RAID

5.1.2 Main processing system - 192.168.88.52

- Requested team Anomalie to install the hards disks in the server
- The first attempt failed since the hard disks were not detected by the OS
- Supported team Anomalie by the hard disk installation. Unfortunately the disk were still not detected by the OS after the installation. To get more information we downloaded and installed the MegaRAID software. It turned out that the RAID configuration is different between the main and the backup processing system. For the main processing system the RAID controller did not forward the disks to the OS. Spent some time to find another solution.

6 Saturday - 02.11.2024

Today the focus lied on the update of the graphical user interfaces(GUIs). In the morning met the operators on duty in the warning room and explained shortly what we will do. One of the operators asked what are the changes of the update. We pointed them to the official SeisComP changelog. We also aksed if they will join the training next week but they knew nothing about it. Asked Mr. Wolfgang why they got no information about the training.

- Team Anomalie told us that they only reboot the sc-gui-prod and toast system each Thursday
- Asked team Anomalie if they still have problems when they reboot the sc-gui-prod system or toast system. This was an issue notic during the last maintenance trip. They told us that they have no problems anymore.
- Phone call with Mr. Wolfgang to talk about the upcoming training. He confirmed that Bali is official invited to the training
- Downloaded training VM on the traveview system. Informed the operator on duty about that and that he can share this information with the team.

6.1 traceview - 172.19.112.242

- Logged into the system and checked the installation for local changes. The modules fdsnws and scvoice were added to the autostart but they were not running.

```
sysop@traceview:~/seiscomp$ seiscomp status enabled
scmaster            is not running
fdsnws              is not running [WARNING]
scvoice             is not running
```

- Removed both modules from auto start since it make no sense to run them on this system
- Installed new TOAST dependencies
- Did a system update
- Fetched latest GUI installation from Git
- Restarted the GUIs scrttv, scolv, scesv and scmv on the system.
- Requested team Anomalie to restart the systems due to the system update.

6.2 eventview - 172.19.112.243

- Logged into the system and checked the installation for local changes.
- Installed new TOAST dependencies
- Did a system update
- Fetched latest GUI installation from Git
- Restarted the GUIs scrttv, scolv, scesv and scmv on the system. Moved scesv to wall display.
- Requested team Anomalie to restart the systems due to the system update.

6.3 qcview - 172.19.112.106

- Logged into the system and checked the installation for changes. Found temporary log file *kk* from August. Moved the file to sysop tmp directory.
- Installed new TOAST dependencies
- Did a system update
- Fetched latest GUI installation from Git. The first attempt did not succeed so we had to fetch the data again. The issue may have caused by network issues.
- Restarted the GUIs scrttv, scolv, scesv and scmv on the system.
- Requested team Anomalie to restart the systems due to the system update.

6.4 sc-gui-wall - 172.19.112.221

- Logged into the system and checked the installation for local changes. Some licenses changes have not been applied to Git. We decided to reset the changes since the licenses are part of the update.
- Skipped the system updated since the system has a graphic card and the NVIDIA driver is active
- Installed new TOAST dependencies
- Fetched latest GUI installation from Git
- Restarted the GUIs scrttv, scolv, scesv and scmv on the system
- Noticed that the GUIs used the wrong SeisComP framework version since we forgot to upload the sc-gui-wall branch changes to the remote. Logged into the sc-gui-wall systemm in Jakarta and uploaded the changes. Then we fetched the installation from Git and asked team Anomalie to restart the GUIs again. After this the GUIs used the SC frame work version 6.5.1.

6.5 sc-gui - 172.19.112.241

- Logged into the system and checked the installation for local changes. In the scolv configuration the option picker.loadStrongMotion has been set to true. We kept the settings.
- Installed new TOAST dependencies
- Fetched latest GUI installation from Git
- Team Anomalie restarted the GUIs
- Cleaned up core dump folder

6.6 toast - 172.19.112.108

- Logged into the system and checked the installation for local changes. The following TOAST dissemination scripts have been modified: disseminateaeic.sh, disseminatentwc.sh and disseminatertsp.sh. We kept the changes since we guess they have been made by Mr. Yedi.
- Installed new TOAST dependencies
- Fetched latest GUI installation from Git
- Did some basic TOAST testing, e.g., computed a simulation
- Team Anomalie restarted the GUIs
- Informed the operator on duty that we have finished the update of the GUIs and they can use it as usual

6.7 LTS data setup

During the maintenance trip in Jakarta we discussed the long term storage of the Bali event data. This was requested a while ago by Mr. Dwi. In Jakarta we agreed to put the data on the backup processing system in Bali.

- We noticed that some servers in the warning room are not used anymore. We came up with the idea to use one of them for the event data archive. Team Anomalie got in touch with Mr. Yedi but we wanted that the data is stored on proc2 as discussed.
- Evaluated several options how the data storage could be realized. A second SC database and QuakeLink instance would require an additional installation with different port settings. We preferred to use the existing lts data setup from Jakarta but this is not possible as if 2 processing systems should run on the same system the data ports must be changed. As we wanted to keep the configuration as simple as possible we decided to store the event data in proc2 forever or as long as the BMKG provides an extra LTS data system for Bali.
- Checked the crontab settings of proc2 and it turned out the scdbstrip entry has been disabled some time ago. That means the system holds event data already forever.
- Checked with scolv the detected earthquakes of the last 3 days. Here we found that the system just contains manual solutions as the EQ data exchange between proc1 and proc2 were disabled a while ago due to some side effects with scimex. Added the reactivation to our to-do list for tomorrow.

6.8 New TOAST system

This section describes the installation of the client/server TOAST system in Bali. BMKG requested the installation shortly before we left to Indonesia. At first it was only planned to install the client and the server on the same system. As we checked the server room in Bali we saw that there was a server with the label "toast-server". We asked team Anomalie about the system and they told us that it can be used for the installation.

6.8.1 TOAST client - 172.19.112.236

The operating system installation has been provided by team Anomalie whereas gempa setup the system.

- Copied prepared TOAST installation from Git to the workstation

6.8.2 TOAST server - 172.19.112.237

The operating system installation has been provided by team Anomalie whereas gempa setup the system.

- Copied prepared TOAST installation from Git to the workstation

7 Sunday - 03.11.2024

7.1 proc1 - 172.19.112.192

- Comparison between the active configuration of proc1 and proc2
- Compressed the etc directories of both systems and copied it to one of our local systems
- Compared both directories with meld. Both systems are almost identical except the following differences:
  - Station IA.PSI uses the SH stream on proc2 whereas it uses the BH stream on proc1. The corresponding acqui server holds BH streams only for that station
  - Station IA.DWIKO is configured on proc2 only but the acquisition server has no data for that station
- Due to the findings we decided to use the proc1 as reference system and also because it is actively used by BMKG
- Committed all changes made on proc1 and uploaded it to the Git

7.2 proc2 - 172.19.112.193

- Reset all local changes
- Fetched latest configuration changes from Git

7.3 acqui1 - 172.19.112.194

- Comparison between the active configuration of acqui1 and acqui2
- Compressed the etc directories of both systems and copied it to one of our local systems
- Compared both directories with meld. The differences between the systems are significant and could not be resolved by us because this needs to be done by someone who knows exactly where the system should get data from. Due to this reason we decided to create separate branches for acqui1 and acqui2.
- Created a new branch acqui1-bali-stable
- Committed all changes and uploaded it to the Git

7.4 acqui1 - 172.19.112.195

- Created a new branch acqui2-bali-stable
- Committed all changes and uploaded it to the Git

8 Monday - 04.11.2024

- Met Mr. Dwi and asked him about the training today. We told him that this is a hands on training and the participants need a laptop with virtual box installed. We also told him that we have already download the VM.
- Prepared 2 laptops for the training
  - Installed virtual box under Ubuntu 22.04 but had some issue due to secure boot. We had to set a password to continue the installation: Password sysopbmkg2023$. After reboot we selected enroll mok and had to put in the password to confirm the secure boot changes.
  - Imported the image with virtual box
  - Had some issues to get the VPN working

8.1 QuakeLink data exchange

Since the last maintenance trip in February 2024 the EQ data exchange between proc1 and proc was disabled because there were some synchronization problems in combination with scimex. We decided to re enable the exchange so that proc2 has the manual solutions as well.

8.1.1 proc1 - 172.19.112.192

- Re enabled ql2sc and started the service
- Committed and uploaded the changes to the Git

8.1.2 proc2 - 172.19.112.193

- Fetched latest changes from Git
- Started ql2sc service
- Checked database for manual events received from proc1. The system successfully received data from proc1.

8.2 Historical data

Today morning the Bali staffed asked how they can access historical event data. We told them that the proc2 system holds the data now for forever but the archive contains just the last 2 years. The remaining data is available on the lts-data in Jakarta only. The lts data holds all manual Jakarta events and some manual Bali Events since when Bali is operational the events are sent to Jakarta. We checked the existing systems and found some old QuakeLink archives on 2 systems. We decided to import the data into proc2 so that more historical data is available.

- Cleaned up the QuakeLink archives with the tool *ql-rev-limit.py*. Kept up to 500 revisions.
- Copied the old archives from the 172.19.112.53 and 172.19.112.129 to proc2 into an extra directory
- Made the decision to replace the events from proc2 with the one from proc1 in order that the archive is complete
- Copied the QuakeLink archive from proc1 to to proc2
- Dumped SeisComP database on proc2
- Merged the archives into a new directory
- Created bash script to import events from final QuakeLink archive into database
- Removed SeisComP database and initialized an empty SeisComP database
- Run *seiscomp update config* to load inventory and bindings into database

8.3 toast-server - 172.19.112.237

- Setup Git aliases
- Checked the scmaster log for unexpected entries and found that the agency BMKG-Bali is not on the white list -> Those events are ignored.
- To fix the issue changed the scmaster configuration by loading the white list value from env variable
- Committed the changes and uploaded it to Git.
- Checked the incident log for incoming events and messages from the proc system

8.4 Git cleanup

- Removed no longer SC5 and Ubuntu 20.04 remote branches from Git.
- Removed branches that have been separated into new branches and the original branches are no longer required.

8.5 toast - 172.19.112.108

Team Anomalie told us yesterday that the operational TOAST system uses just one hard disk even a second is installed. We noted that the second hard disk is not recognized by the operating system and took the following steps to solve the issues:

- Asked team Anomalie to check if the second hard is activated in the BIOS. Therefore they shutdown the system and accessed the BIOS. The connected slot was activated but the hard disk was not visible.
- Team Anomalie got in touch with Jakarta to request a new hard drive. The replaced the broken disk.
- Started the TOAST system

9 Tuesday - 05.11.2024

- Cleaned up remote branches on all systems in Bali and the backup system in Jakarta.
- Checked again the EQ data exchange between proc1 and proc2:
  - proc1

```
python3 eventlst.py -d 172.19.112.192 --begin "2024-11-05 00:00:00"
bmg2024vsoq 4.35 A A 2024-11-05 00:05:44 BMKG-BALI1
bmg2024vspb 2.37 M M 2024-11-05 00:19:02 BMKG-BALI
bmg2024vspe 3.11 M M 2024-11-05 00:22:13 BMKG-BALI
bmg2024vspt - A A 2024-11-05 00:39:07 BMKG-BALI1
bmg2024vsqe 2.43 M M 2024-11-05 00:52:48 BMKG-BALI
bmg2024vsqi 2.59 M M 2024-11-05 00:56:37 BMKG-BALI
bmg2024vsrn 2.68 M M 2024-11-05 01:33:08 BMKG-BALI
bmg2024vsrs 3.53 M M 2024-11-05 01:38:31 BMKG-BALI
bmg2024vsrz 2.88 M M 2024-11-05 01:47:37 BMKG-BALI
bmg2024vssf 2.35 M M 2024-11-05 01:53:48 BMKG-BALI
bmg2024vsss 2.84 M M 2024-11-05 02:08:58 BMKG-BALI
bmg2024vssu 3.50 M M 2024-11-05 02:12:01 BMKG-BALI
bmg2024vssz 2.55 A M 2024-11-05 02:17:58 BMKG-BALI
bmg2024vstf 3.51 M M 2024-11-05 02:23:53 BMKG-BALI
bmg2024vsth 2.64 M M 2024-11-05 02:27:15 BMKG-BALI
bmg2024vstk 2.47 M M 2024-11-05 02:30:05 BMKG-BALI
bmg2024vstl 2.37 M M 2024-11-05 02:31:30 BMKG-BALI
bmg2024vstn 2.42 M M 2024-11-05 02:34:11 BMKG-BALI
bmg2024vsto 2.87 M M 2024-11-05 02:35:14 BMKG-BALI
bmg2024vstq 2.47 M M 2024-11-05 02:36:50 BMKG-BALI
bmg2024vsuu 4.57 M M 2024-11-05 03:12:10 BMKG-BALI
bmg2024vsvd 2.19 M M 2024-11-05 03:22:59 BMKG-BALI
bmg2024vsvl 2.32 M M 2024-11-05 03:32:09 BMKG-BALI
bmg2024vswb 3.05 M M 2024-11-05 03:50:22 BMKG-BALI
bmg2024vswt 2.44 M M 2024-11-05 04:12:03 BMKG-BALI
```

  - proc2

```
python3 eventlst.py -d 172.19.112.193 --begin "2024-11-05 00:00:00"
bmg2024vspb 2.37 M M 2024-11-05 00:19:02 BMKG-BALI
bmg2024vspe 3.11 M M 2024-11-05 00:22:13 BMKG-BALI
bmg2024vspt - A A 2024-11-05 00:39:07 BMKG-BALI2
bmg2024vsqe - M M 2024-11-05 00:52:48 BMKG-BALI
bmg2024vsqi 2.61 M M 2024-11-05 00:56:37 BMKG-BALI
bmg2024vsrn 2.64 M M 2024-11-05 01:33:08 BMKG-BALI
bmg2024vsrs - M M 2024-11-05 01:38:31 BMKG-BALI
bmg2024vsrz 2.88 M M 2024-11-05 01:47:37 BMKG-BALI
bmg2024vssf - M M 2024-11-05 01:53:48 BMKG-BALI
bmg2024vsss 2.88 M M 2024-11-05 02:08:58 BMKG-BALI
bmg2024vssu 3.54 M M 2024-11-05 02:12:01 BMKG-BALI
bmg2024vssz 2.62 A M 2024-11-05 02:17:58 BMKG-BALI
bmg2024vstf 3.54 M M 2024-11-05 02:23:53 BMKG-BALI
bmg2024vsth - M M 2024-11-05 02:27:15 BMKG-BALI
bmg2024vstk 2.45 M M 2024-11-05 02:30:05 BMKG-BALI
bmg2024vstl - M M 2024-11-05 02:31:30 BMKG-BALI
bmg2024vstn 2.44 M M 2024-11-05 02:34:11 BMKG-BALI
bmg2024vsto 2.87 M M 2024-11-05 02:35:14 BMKG-BALI
bmg2024vstq 2.47 M M 2024-11-05 02:36:50 BMKG-BALI
bmg2024vsuu 4.57 M M 2024-11-05 03:12:10 BMKG-BALI
bmg2024vsvd - M M 2024-11-05 03:22:59 BMKG-BALI
bmg2024vsvl 2.36 M M 2024-11-05 03:32:09 BMKG-BALI
bmg2024vswb - M M 2024-11-05 03:50:22 BMKG-BALI
```

  - As in Jakarta the magnitude values are slightly different between the systems and sometimes magnitudes are not set preferred on the backup system. This issue is already on our To-Do list.
  - The EQ data export is working as expected.

9.1 geof - 202.90.198.201

- Uploaded changes of the SeisComP installation to Git remote
  - Checked the Git for changes -> No relevant changes.
  - Uploaded the last commits to the remote
  - Cleaned up local and remote branches
- Setup Git remote for WebDC3 on gitea.gempa.de
  - Created new remote repository
  - Set access permissions
  - Setup the Git remote
  - Created a new branch stable
  - Committed all changes of the WebDC3 installation
  - Uploaded the changes to remote
  - Cleaned up local branches

9.2 toast - 172.19.112.236

- The operators asked some question about the new new InSAR(licsar data import plugin) map feature in TOAST. Told them that this feature has been added in February this year. Later Mr. Wolfgang forwarded the same question from Mr. Yedi to us. Explained Mr. Wolfgang by phone the details about this feature.
- Noted that the core dump configuration of the system is wrong and fixed that
- Added crontab entry to make sure licsar2caps is running

9.3 Historical data

Continued the event data import from yesterday.

- Imported the events from 2023 and 2024 from proc1 into the database
- Imported the events from 2017 to 2021 from different source, e.g, Nagios system (former temp lts data)
- Synced the QuakeLink DB with the archive

```
seiscomp exec quakelink --sync-db
```

9.4 toast - 172.19.112.108

Added new hard disk to software RAID as follows

- Listed the available devices

```
root@toast:~# cat /proc/partitions
major minor  #blocks  name

   7        0          4 loop0
   7        1      65224 loop1
   7        2      65508 loop2
   7        3      76028 loop3
   7        4      75648 loop4
   7        5     278636 loop5
   7        6     280160 loop6
   7        7     516252 loop7
 259        0 1953514584 nvme1n1    <--- new HDD
 259        2 1953514584 nvme0n1
 259        3    1100800 nvme0n1p1
 259        4     512000 nvme0n1p2
 259        5   67108864 nvme0n1p3
 259        6 1884790784 nvme0n1p4
   9        1   67042304 md1
   9        0     510976 md0
   9        2 1884658688 md2
  11        0    1048575 sr0
   7        8     517212 loop8
   7        9      93888 loop9
   7       10      89120 loop10
   7       11      89128 loop11
   7       12      39664 loop12
   7       13      39760 loop13
```

- The device **/dev/nvme1n1** is the new hard disk which replaces the broken one
- Copied the partition table from the working to the new hard disk and created a new UUID with

```
sgdisk -R /dev/nvme1n1  /dev/nvme0n1
sgdisk -G /dev/nvme1n1

root@toast:~# cat /proc/partitions
major minor  #blocks  name

   7        0          4 loop0
```

```
  7         1       65224 loop1
  7         2       65508 loop2
  7         3       76028 loop3
  7         4       75648 loop4
  7         5      278636 loop5
  7         6      280160 loop6
  7         7      516252 loop7
259         0  1953514584 nvme1n1    <--- new HDD
259        10     1100800 nvme1n1p1 <--- new partion 1
259        11      512000 nvme1n1p2 <--- new partion 2
259        12    67108864 nvme1n1p3 <--- new partion 3
259        13  1884790784 nvme1n1p4 <--- new partion 4
259         2  1953514584 nvme0n1
259         3     1100800 nvme0n1p1
259         4      512000 nvme0n1p2
259         5    67108864 nvme0n1p3
259         6  1884790784 nvme0n1p4
  9         1    67042304 md1
  9         0      510976 md0
  9         2  1884658688 md2
 11         0     1048575 sr0
  7         8      517212 loop8
  7         9       93888 loop9
  7        10       89120 loop10
  7        11       89128 loop11
  7        12       39664 loop12
  7        13       39760 loop13
```

- Added partitions to RAID devices with

```
mdadm /dev/md1 -a /dev/nvme1n1p3
mdadm /dev/md2 -a /dev/nvme1n1p4
mdadm /dev/md0 -a /dev/nvme1n1p2
```

- Installed GRUB boot loader on the new hard disk

```
grub-install /dev/nvme1n1
```

10 Wednesday - 06.11.2024

- Worked on documentation
- Corrected crontab entry on proc2. Changed *seiscomp start* to *seiscomp check*
- Talked with Mr. Dwi and the operators about the new TOAST
  - They noted the arrival results are not visible for TsunAWI. We confirmed that and told them that we work on a fix for that.
  - Told them to create tickets in the support portal when something is not working or they have feature requests
  - Talked about the landslide algorithm of the Japanese system and if they have results for the 2018 event. Unfortunately they did not have results.
  - We asked which input parameters are required by the algorithm: Location, Length, Width, Dip, Strike, Depth?

- We also asked how they want to detect landslides. Answer: They want to monitor local tide gauge data for changes and react if certain thresholds are exceeded. The local station are not part of the SeisComP system at the moment and can displayed via a special web GUI. Mr. Yed and Mr. Yanuar are in charge.

11 Open points

- Think about how to maintain the gsm status. Idea: Keep configuration only -> Postponed until we are back in office.
- Mw issue proc1 and lts data
- For the manual created event bmg2024vkvz the magnitude has not been set preferred on the backup system.
- Toast operational and toast client show different simulations and events are not stored in database

```
2024/10/31 03:30:05 [error/MYSQL] execute("insert into TsunamiLog(_oid,_parent_oid,creationInfo_agencyID,c
2024/10/31 03:30:05 [error/DatabaseArchive] writing object with type 'TsunamiLog' failed
2024/10/31 03:30:05 [warning/dbstore] Error handling message from multi-toast-client-toast to TSUNAMI
2024/10/31 03:30:05 [error/MYSQL] execute("insert into TsunamiLog(_oid,_parent_oid,creationInfo_agencyID,c
2024/10/31
```

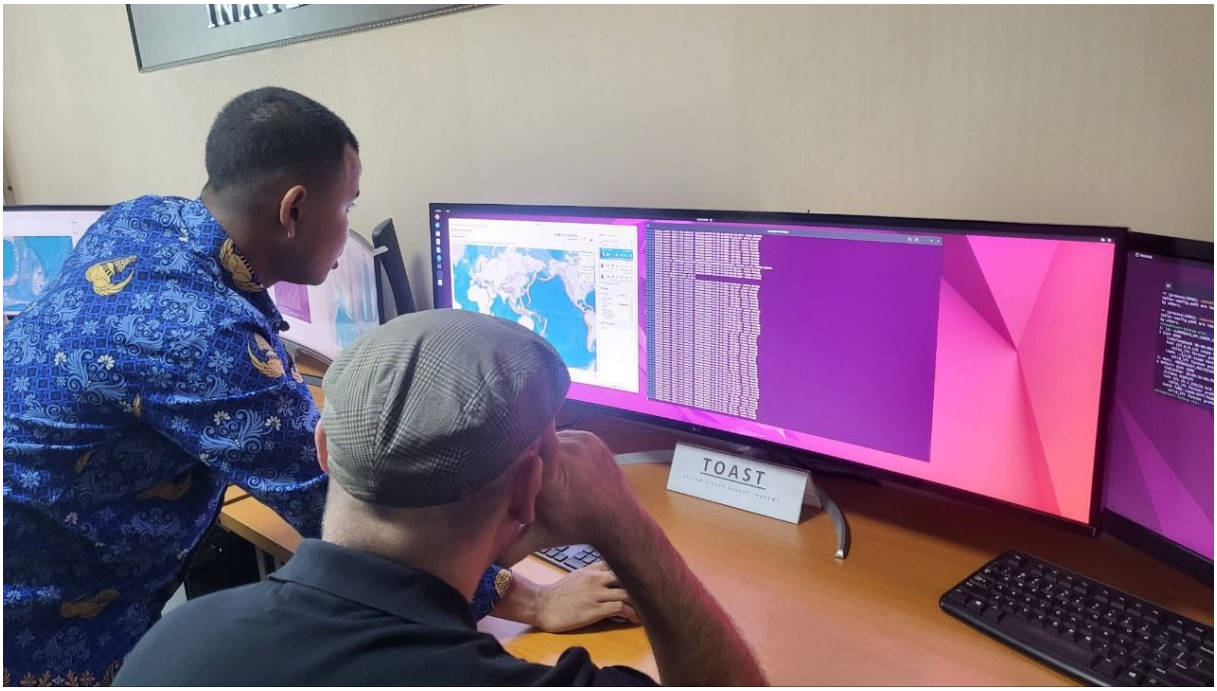
- The NTWC forecast zones bulletin does not contain a time stamp on the map in the left bottom corner
- TsunAWI simulation returns to arrival results
- Discuss landslide integration as simulation plugin
- QL sync show progress

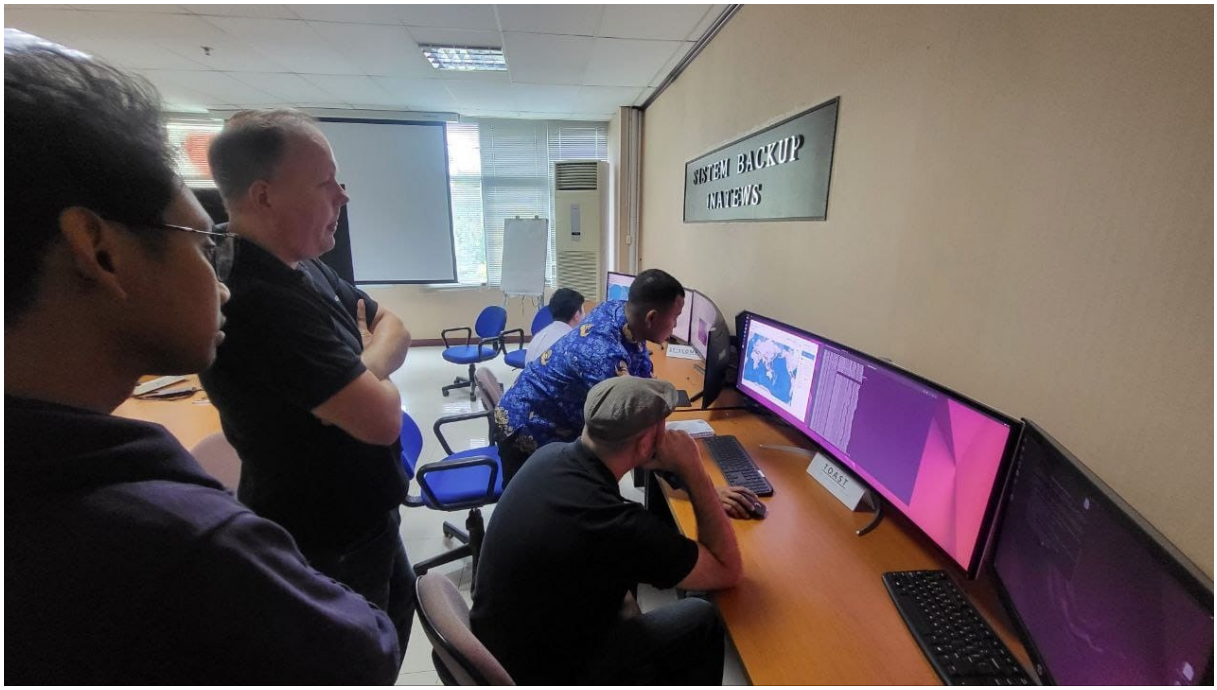
gempa

Impressions of the On-Site Corrective Maintenance January - December 2024

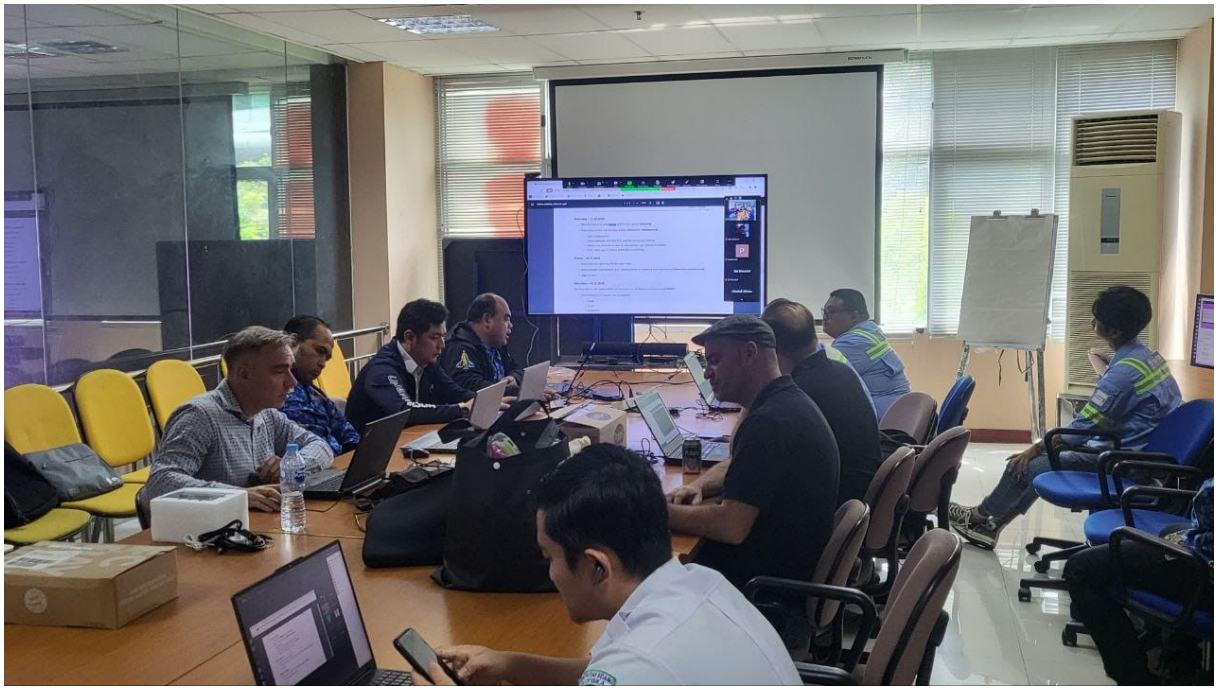
provided remote and addressing scientific as well as technical issues on seismology, natural hazard, tsunami modeling.

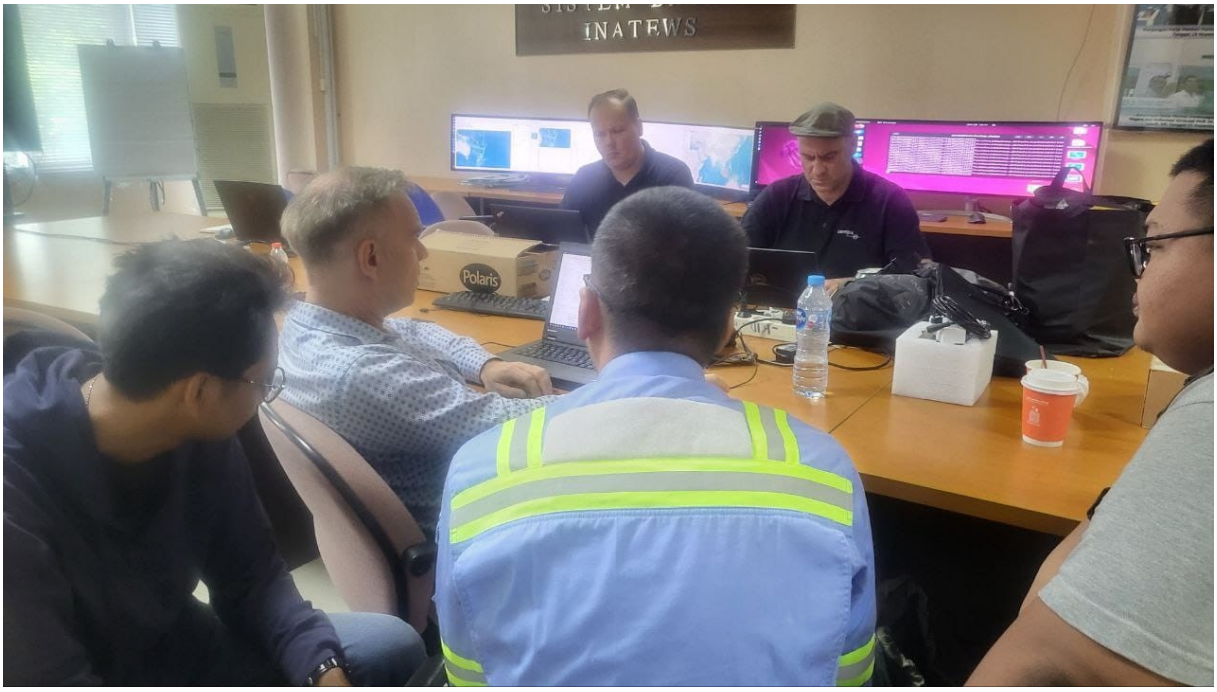
The following training course with the following topics was given.

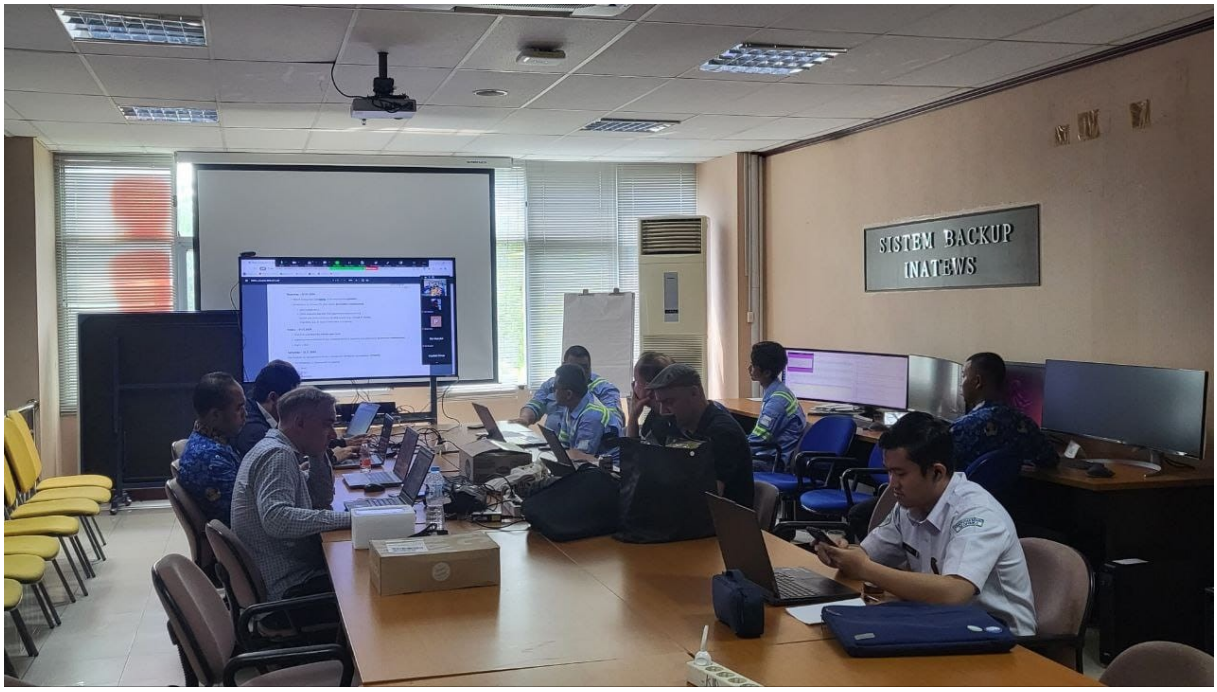

TOAST

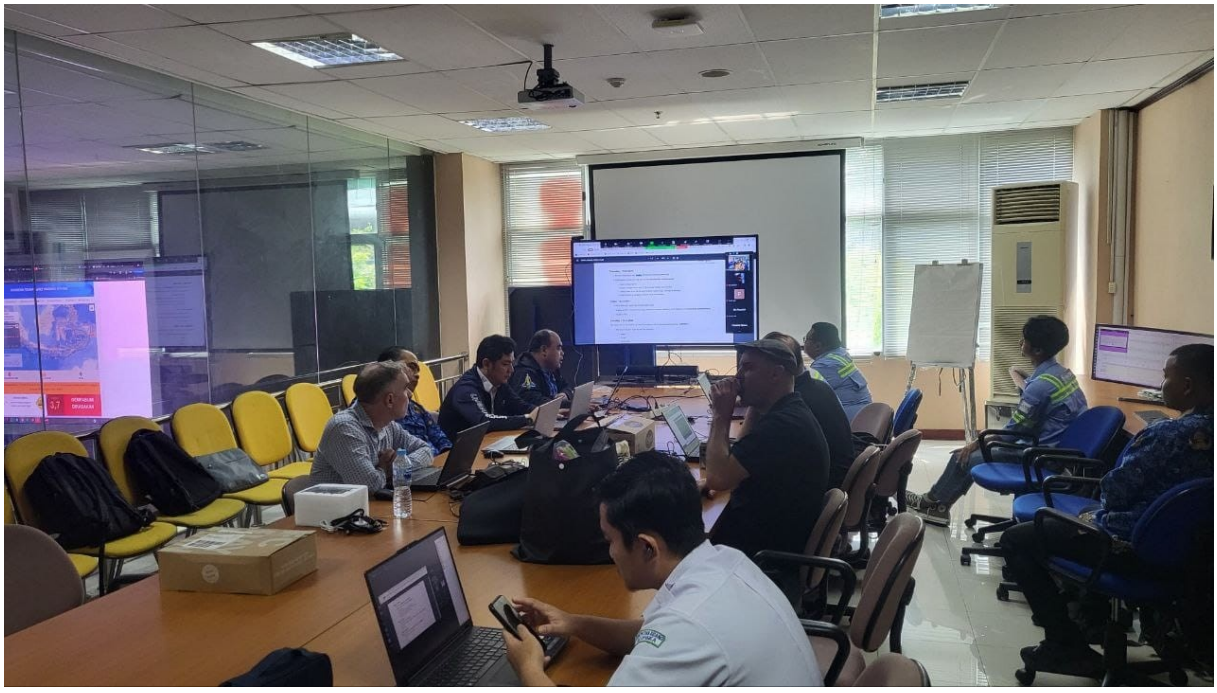

SISTEM BACKUP
INATEWS
TOAST


SISTEM BACKUP
INATEWS
Polaris



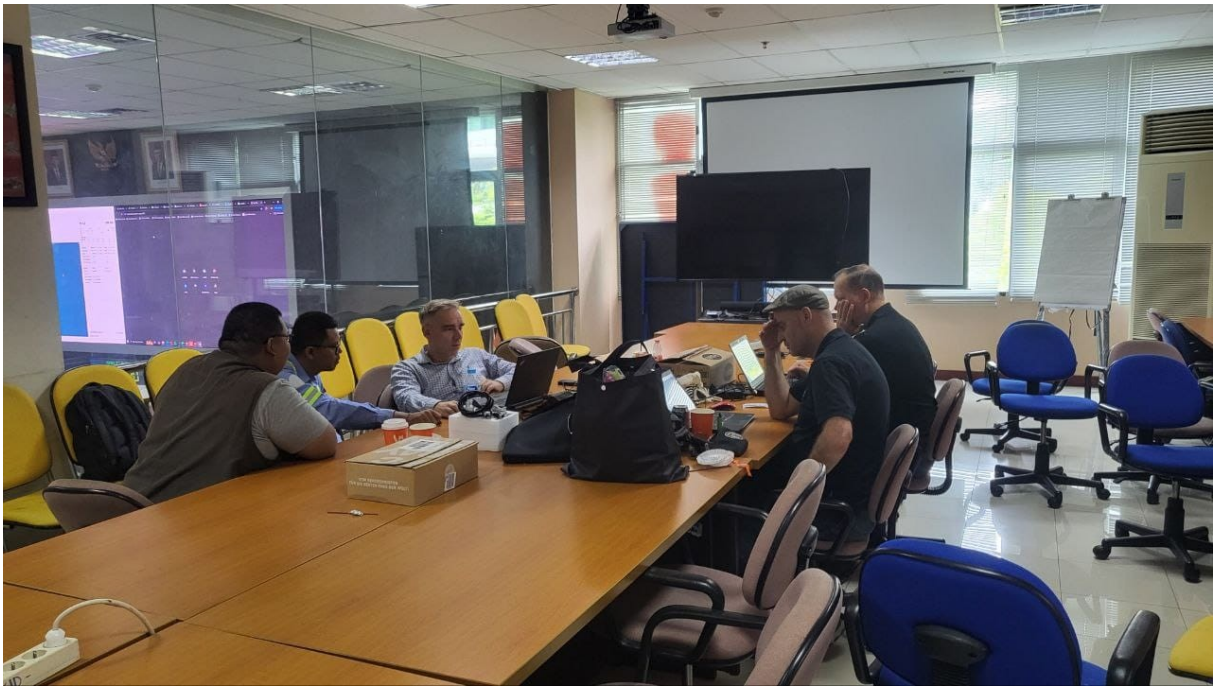

INATEWS
Polaris


SISTEM BACKUP
INATEWS



gempa

gempa




SOP SPK 2020 VERSI 1
SOP
NTWC
V3.2023


InaTEWS


P1 SEISCOMP
P1 DISEMINASI
INATEWS


BMKG
BALAI BESAR MKG WILAYAH III

gempa

Training’s by International Experts

2024

provided remote and addressing scientific as well as technical issues on seismology, natural hazard, tsunami modeling.

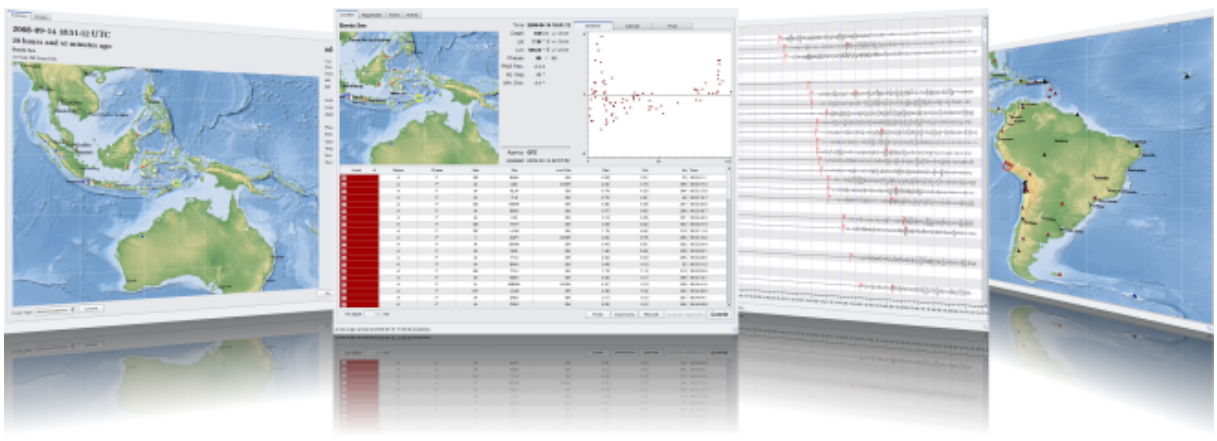
The following training course with the following topics was given.

gempa

TOAST Course BMKG 2024
Training Material for Users and Operators

Dr. Andreas Höchner and the team of gempa

November 3, 2024



Contents

1 Scope of this document

This document provides the content of the TOAST Training by gempa GmbH as well as auxiliary material and supplementary information.

As TOAST builds on the SeisComP ecosystem, and is usually connected to a SeisComP processing system via messaging in order to obtain earthquake solutions, this document contains many sections and references regarding SeisComP.

2 About us

gempa (Global Earthquake Monitoring Processing Analysis) GmbH, Potsdam, Germany is a software development and service company providing installation, training, support and maintenance for SeisComP and many other customized products based on the SeisComP software framework. The products are:

- CAPS- multi-format acquisition server
- scanloc- Earthquake detection and localization through cluster search
- sceval- Evaluation of origins
- npeval- Network performance evaluation
- scqceval- Station QC evaluator and automatic network re-configurator
- MTV and AUTOMT - moment tensor analysis
- TOAST- tsunami early warning system
- GDS- dissemination of earthquake information
- GIS- image generator
- GAPS- web based SeisComP GUIs
- QuakeLink- Secure, fast and focused exchange of event parameters
- EQEvents - Fast event browser
- EQInfo - A free earthquake App for Android
- FDSNWS-Frontend - A user-friendly Web frontend for FDSNWS
- SIGMA- Seismic Intensity and Ground Motion Analysis
- LAMBDA- Real-time and offline array processing (seismic and infrasound data)
- GAPS - Web-based SeisComP GUIs complementing scolv, scrttv, scmv, scesv
- SHARD - Structural Health Monitoring
- VORTEX - Volcano monitoring

Find a list of SeisComP - related gempa products also on `http://gempa.de/products` or `https://demo.gempa.de` and `http://demo.gempa.de`. Contact us at any time for more information: `info@gempa.de`.

2.1 gempa company profile

gempa

gempa - the SeisComP Service Company

Dr. Bernd Weber and the team of gempa

gempa GmbH, Potsdam, Germany

gempa - The SeisComP Developing and Service Company

gempa

The Company Profile

- Commercial spin-off of German Research Center for Geosciences, GFZ Potsdam: 2008
- Owned by Dr. Bernd Weber and Jan Becker
- 15 employees: seismologists, software engineers, system administrators and Web developers, additional students
- Software development driven by research:
  - earthquake monitoring: global, local, induced seismicity monitoring, e.g., geothermal or hydrocarbon production, mining, ...
  - tsunami early warning, earthquake early warning
  - customized software, e.g. for INSIGHT - NASA mission planet Mars
- Software maintenance, installation, tuning, training
- Turnkey solutions
- Clients: tsunami warning centers, earthquake services, research centers, energy and mining industry

Research and Development Focus Areas

gempa

- 2006 automatic detection and localization of tsunamigenic and teleseismic earthquakes
  - SeisComP
- 2010 moment tensor solutions
  - AUTOMT/MTV
- 2010 microseismic monitoring software development
  - ccloc
- 2012 tsunami early warning
  - TOAST
- 2012 product dissemination
  - GDS/GIS/QuakeLink
- 2014 local earthquake monitoring
  - scanloc
- 2015 origin quality evaluation
  - sceval
- 2016 structural health monitoring
  - SHARD
- 2017 network performance monitoring
  - npeval
- 2017 shake maps and strong motion processing
  - SIGMA
- 2018 array processing
  - LAMBDA
- 2020 event classification
  - KAPPA

Main Clients in the Region

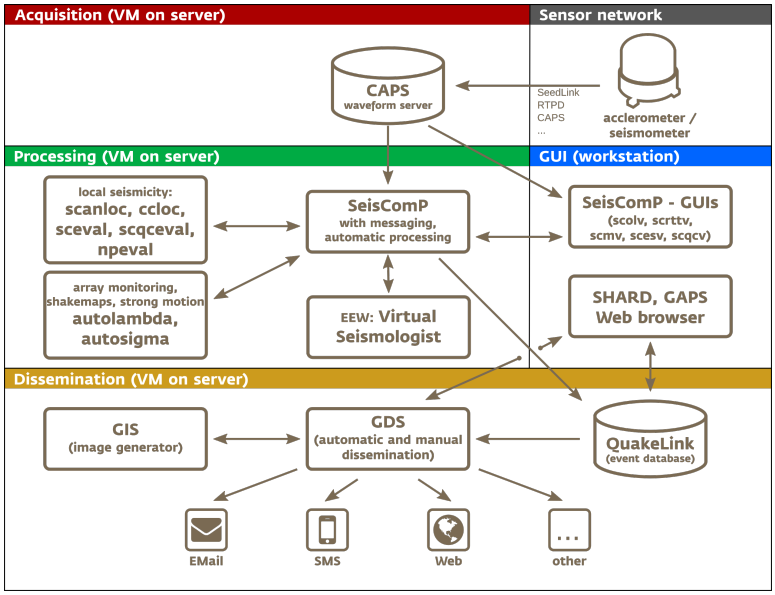
gempa

- **BMKG, Indonesia:** earthquake monitoring, tsunami early warning (TEWS)
- **DGMET, Oman:** earthquake monitoring, tsunami early warning (TEWS)
- **GA, Australia:** earthquake monitoring
- **GNS, New Zealand:** earthquake monitoring, tsunami early warning (TEWS)
- **IMD, India:** earthquake monitoring
- **INCOIS, India:** earthquake monitoringIndia, India: earthquake monitoring
- **KIGAM, S-Korea:** earthquake monitoring
- **NCMS, UAE:** earthquake monitoring, tsunami early warning (TEWS)
- **NEA, Singapore:** earthquake monitoring, tsunami early warning (TEWS)
- **TMD, Thailand:** earthquake monitoring, tsunami early warning (TEWS)

gempa Products Based on SeisComP I

gempa

Add-ons enhancing acquisition, processing, interaction and dissemination



gempa Products Based on SeisComP II

gempa

gempa modules enhancing SeisComP in acquisition, processing and interaction

Name	Clients	Description
CAPS	~50	Multi format acquisition server
RecordStream		Distributed data acquisition, optimized data archiving
scanloc	~95	Cluster search based locator using P- and S-phases
ccloc	~20	Cross-correlation detector and locator
npeval	~10	Network performance evaluator
sceval	~45	Origin quality evaluator
scqceval	~10	Data QC evaluator and automatic network re-configurator
AUTOMT/MTV	~40	Automatic and interactive moment tensor calculation
LAMBDA	~10	Array seismology and infrasound
SIGMA	~35	Strong motion earthquake parameters
TOAST	~15	Tsunami observation and simulation
VORTEX	~10	Volcano monitoring supporting RSAM and SSAM

gempa Products Based on SeisComP III

gempa

gempa modules enhancing SeisComP in **Dissemination** and **WEB Applications**

Name	Clients	Description
GDS with GIS	> 50	Dissemination server with image generator
Map plugins		Add different map projections, grid layers and sources
QuakeLink	~100	Real-time event information streaming
GAPS	~45	Browser based WebGUIs replacing scrttv, scmv, scesv, scolv
SHARD	~10	Structural health monitoring
FDSNWS-frontend		User-friendly frontend for FDSNWS
EQEvents		Customizable static websites
WebConfig	~10	Browser-based SeisComP configuration
SMP	free usage	Browser-based station inventory management
EQInfo	free usage	Earthquake information App for Android

Online demonstrations and documentations: `https://demo.gempa.de`

Product overview: `https://www.gempa.de/products/` **Contact us:** info@gempa.de

3 About this TOAST Training

3.1 Course organization

gempa

TOAST training 4.- 6.11.2024
BMKG

Tsunami **O**bservation and **S**imulation **T**erminal – TOAST

gempa GmbH, Potsdam, Germany

TOAST training 2024 BMKG – Lecturer: Dr. Andreas Höchner

gempa

- 2019 - gempa GmbH
  - TOAST development coordination
  - TOAST training
- 2011 - 2018 Postdoctoral researcher at GFZ German Research Centre for Geosciences
  - Tsunami hazard assessment (TSUMAPS NEAM project)
  - Tsunami early warning and modeling (Tohoku event)
  - GNSS inversion
- 2006 - 2011 Doctorate Geophysics University of Potsdam
  - GITEWS project: German Indonesian Tsunami Early Warning System
  - Section Earthquake source modeling
- 2002 Diploma in Physics, University of Zurich

TOAST training 2024 BMKG – Participants

gempa

- How are you involved with TOAST?
- What is your role?
- What is your background?
- Do you have experience with Tsunami Early Warning?
- What do you expect from the course?
- Do you have experience with Linux?
- VM IPs
  - Every VM can be reached via SSH from an other VM
  - `show-ip` in terminal
  - `ssh -Y ip`
- Additional gempa staff
  - Wolfgang Kohl
  - Faustino Blanco

TOAST training 2024 BMKG – Agenda

gempa

Day 1	Mon		
Module	**Start**	**End**	**Topic**
1	07:00 CET		- Introduction - About gempa GmbH - Training materials - Scope of training
2			- TOAST-multiuser Architecture - BMKG training VM overview - SeisComP Control - Configuration - What's New
		12:00 CET	- TOAST User Interface and Workflow

Day 2	Tue		
Module	**Start**	**End**	**Topic**
3	07:00 CET		- Templates - Threat Levels (non-seismic incidents)
4			- Tsunami Background
		12:00 CET	- GNSS functionality

Day 3	Wed		
Module	**Start**	**End**	**Topic**
5	07:00 CET		- SeisComP What's New (Dr. B. Weber)
6			- Simulation Playback Optional - Forecast Zones - Bathymetry
		12:00 CET	- Other gempa products

3.2 Course scope

This TOAST user training provides an in-depth introduction to the setup and operation of TOAST.

After successful completion of the course, the participant will be able to:

- Install and run TOAST on an own computer or in a virtual machine
- Configure TOAST to read waveforms from archives and to use inventory information from tide gauge stations
- Import events and create incidents
- Run tsunami simulations
- Configure and adapt forecast zones and points
- Configure and adapt templates and live tabs
- Disseminate bulletins
- Background information on tsunami and earthquakes

3.3 Course requirements

For a successful completion of the course the attendees are expected to have at least

- Have available their 64 Bit Laptop with 8 GB RAM and 50 GB hard drive space
- Have installed Oracle VirtualBox for 64 Bit virtual machines
- Basic knowledge of the Linux operational system and Linux commands
- Connection from the Laptop to the internet using WLAN or Ethernet and IPv4.

3.4 Do it yourself - getting help

SeisComP can be used free of any charges for non commercial usage, if the user accepts and respects the licences of SeisComP. Support by GFZ Potsdam, however, is limited to coordination and contribution to the ongoing software development. Specifically, GFZ cannot provide support for installation, upgrading and maintenance issues.

Possibilities for getting support are the SeisComP **wiki**, SeisComP **documentation**, the SeisComP **forum**, and **commercial support** by gempa GmbH. Please use the above means for getting support and do not approach GFZ Potsdam with support requests directly.

3.4.1 Documentation

Online documentation and help on installing, configuring and operating SeisComP for current and older SeisComP releases can be found on the SeisComP web page: http://www.seiscomp.de or on gempa's website: `https://docs.gempa.de`. For example the current release is documented on `https://docs.gempa.de/seiscomp/current/`.

The **documentation of locally installed modules** usually exists in your system. It can be

- Launched from scconfig
- Viewed using an internet browser, e.g.:
  **user@host:~$** firefox file://$SEISCOMP_ROOT/share/doc/seiscomp/html/index.html
- Access from the Help menu of any GUI.

3.4.2 Command-line help

Almost each module provides information on options as a command-line help. An increasing number also shows examples and more explanations. Invoke a module with the option `-h` or `--help` on the command line to get this help.

Example:

```
user@host:~$ toast -h
```

3.4.3 Module debugging on the command line

Almost each module can print informative debug output which help to understand details of the processing by the module. Use the command-line option `--debug` for executing a module with debug output

Example:

```
user@host:~$ seiscomp exec toast --debug
```

3.4.4 Module log files

All trunk (processing) modules write log files to *$HOME/.seiscomp/log/[module].log*. The amount and the level of detail is configurable per module or globally by the global parameters.

`logging.level`

where the default is *2* (errors and warnings). For logging on debug level use *4*. By default, the last 7 log files, either one per day or up to 100MByte file size are kept. The values are configurable by the global `logging.*` parameters.

Stand-alone modules like seedlink, slarchive or slmon write their log files to *$SEISCOMP_ROOT/var/log*.

3.4.5 SeisComP Forum

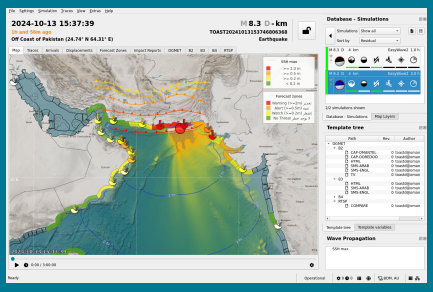
The SeisComP forum is a new interactive web room and the right forum for discussing all SeisComP issues. Here users help other users free of charge and this is a very good way of getting help. Before consulting the mailing list, however, make sure your questions are not covered by the page already (e.g. check topic). Naturally, there is no guarantee of help. To subscribe to the forum, create an account at `https://forum.seiscomp.de`. Please note that even though TOAST is part of the SeisComP ecosystem, being a commercial closed-source product, TOAST related topics are not discussed on the forum.

3.4.6 SeisComP Commercial Support

Commercial support is offered by gempa GmbH. Please contact us for more information: `info@gempa.de`.

3.5 BMKG Training VM Overview

Overview Training VM for BMKG



Dr. Andreas Hoechner

gempa GmbH, Potsdam, Germany

Outline

Motivation

gempa

- Provide a test VM with similar setup as at BMKG
- Familiarize with new TOAST multiuser version
- The TOAST version on the VM is still a development version
- Have a basis for setup and configuration
- VM can be accessed via VPN tunnel tun0

TOAST naming conventions

gempa

- **TOAST server**: scmaster wit TOAST daemon plugin *toastd*
- **TOAST client**: Graphical user interface GUI (actually more than just GUI)
- **GSS**: Gempa Simulation Server, with plugins: simeasywave2
- **Messaging**: SeisComP messaging, done by scmaster, with **Queues**
  - There are two messaging systems set up on the training VM
  - tews/seiscomp-proc with with queue *Production* for for SeisComP processing on port 18180
  - tews/seiscomp-tews with queue *Production* for TOAST processing on port 18181
- **BMKG modules**: licsar2caps (not enabled in VM)

System and Directories

gempa

- The test system runs in a VirtualBox VM with Ubuntu 22.04 as OS
- There are 4 SeisComP installations in the VM
  - `/home/tews/seiscomp-proc`: Seismic processing
  - `/home/tews/seiscomp-tews`: TOAST server
  - `/home/tews/seiscomp-gui`: TOAST client
  - `/home/tews/seiscomp-legacy`: TOAST legacy version
- All directories are under git control to
  - easily track configuration changes
  - allow rollback to previous state
  - Synchronize with internal gempa test system
- Large data files are located at `/home/data` (e.g. maps)

System users

gempa

- Following system users are present on the training VM:
  - **tews**: Starts TOAST server and TOAST client; PW: sysop
  - **ralph**: Additional user, ignore
  - There is **no root** account, as it is an Ubuntu system (use *sudo*)
- The shell aliases defined in `~/.bashrc.d/bash_aliases`
  - **sc-proc**, **sc-tews**, **sc-gui**, **sc-leg**
    allow direct execution of the respective SeisComP binaries.
  - **scps**, **scts**
    are shortcuts to show the status of the enabled modules of proc and tews.
  - **toast-multi, toast-legacy**
    can be used to start the TOAST versions in a terminal with *debug* option.

Enabled SeisComP modules

gempa

- Following modules are enabled on the test system:
  - **scmaster**: SeisComP messaging, DB access, on port 18180
  - **scmaster with TOAST daemon plugin**: toast DB access, on port 18181
  - **GSS**: TOAST Simulation server including plugin EasyWave2
  - **quakelink**: Stores and serves earthquake information for the GDS, also used for toast-playback
  - **ql2sc**: QuakeLink to SeisComP (Used for simulation playback)
  - **scevent**: Origin and magnitude associator, used by simulation playback
  - **CAPS**: Waveform server and archive

Configuration

gempa

Use scconfig for configuration

- SeisComP modules using **sc-proc exec scconfig** `~/seiscomp-proc/etc`
- TOAST daemon and GSS using **sc-tews exec scconfig** `~/seiscomp-tews/etc`
- TOAST client using **sc-gui exec scconfig** `~/seiscomp-gui/etc/toast.cfg`
- TOAST legacy using **sc-leg exec scconfig** `~/seiscomp-legacy/etc/toast.cfg`
- Have a look at the configuration of the modules

Templates

gempa

- Located at `~/seiscomp-tews/share/toastd/templates/bmkg`
- Loaded by TOAST server on startup
- Added to incident by TOAST server upon creation
- Templates are evaluated, that is, bulletins are rendered by TOAST client
- Templates are configured at server: `~/seiscomp-tews/etc/scmaster.cfg`
- Live tabs are configured at client: `~/seiscomp-gui/etc/toast.cfg`
- BMKG template tree is set up

Installation and update procedure

gempa

- Directories
  - `~/install/gsm-proc`: SeisComP installation to `~/seiscomp-proc`
  - `~/install/gsm-tews`: TOAST server installation to `~/seiscomp-tews`
  - `~/install/gsm-gui`: TOAST client installation to `~/seiscomp-gui`
  - `~/install/gsm-legacy`: TOAST legacy installation to `~/seiscomp-legacy`
- Can be used for update via gsm package manager
- gsm uses gempa repository

Architecture and Redundancy for BMKG Upgrade

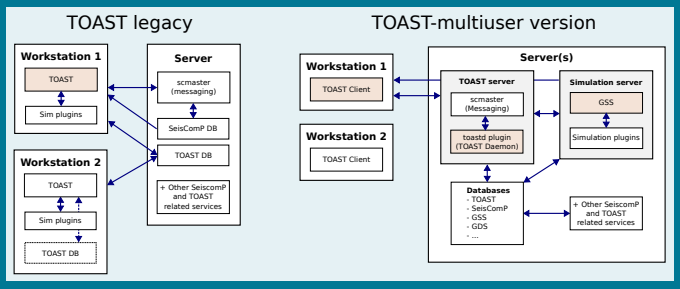
gempa

- Architecture decision for the hardware upgrade and multiuser version at BMKG has not yet been made
- The required level of redundancy has to be considered
- More redundancy while keeping synchronicity is more complex

4 Course Material

4.1 TOAST - Architecture

TOAST Architecture



Dr. Andreas Hoechner and TOAST team

gempa GmbH, Potsdam, Germany

Outline

TOAST - Goals and new requirements

gempa

TOAST design goals:

- Evaluate the risk of tsunami generation using simulations
- Real-time processing and analysis of sensor data
- Dissemination of customized warnings and bulletins
- Provide a GUI for operator interaction

New requirements:

- Allow several users concurrently working on the same incident
- Shield the database from direct user access
- Enable user authentication
- Share simulations across workstations

TOAST Legacy - Multiuser I

gempa

In order to meet new requirements, TOAST is split in three components:

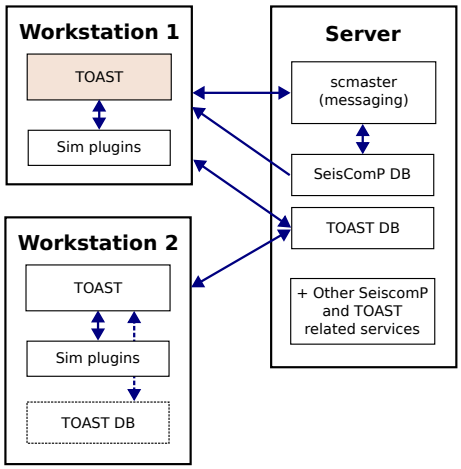
1. TOAST client
   - Graphical user interface
   - Template rendering
   - Same look and workflows as before
2. TOAST server
   - scmaster with TOAST daemon plugin
   - Automatic incident and simulation triggering
   - Template configuration
   - Messaging and database access
3. GSS: Gempa Simulation Server
   - Simulation plugins are configured here
   - Access via telnet and HTTPS REST API

Note: The setup and configuration changes significantly.

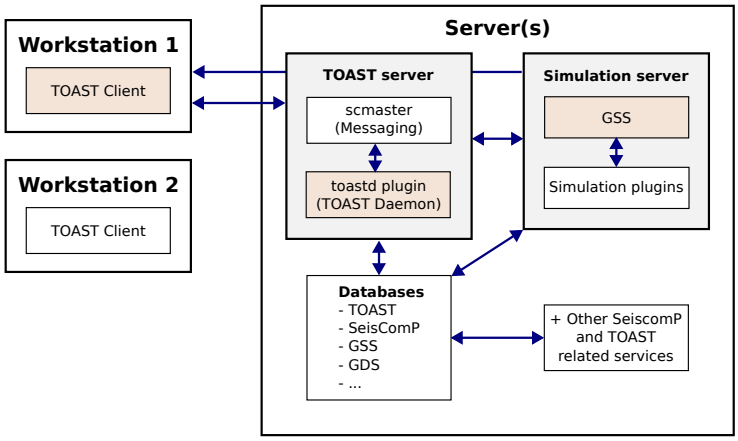
TOAST Legacy - Multiuser II

gempa

TOAST legacy



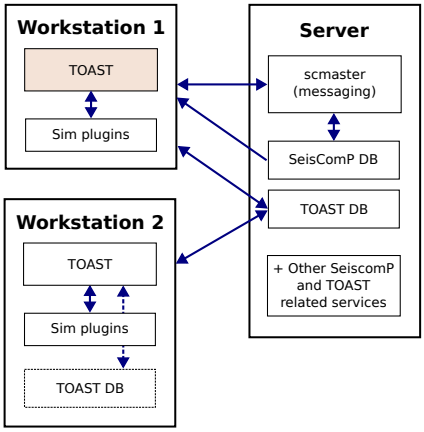
TOAST-multiuser version



TOAST Legacy - Multiuser III

gempa

TOAST legacy

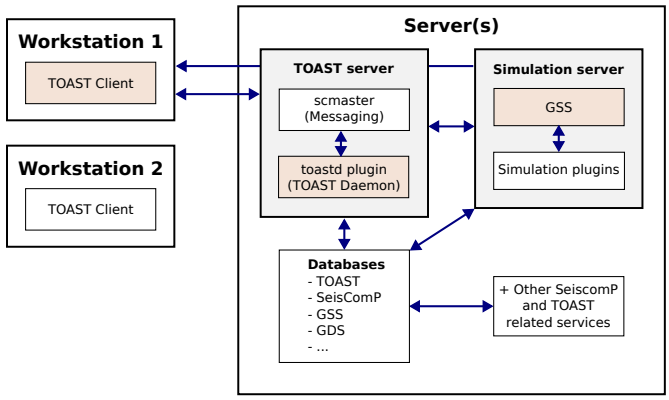


- Automatic incident and simulation creation is triggered independently on workstations
- Simulations are computed on each workstation
- Each TOAST instance writes directly to TOAST database
- Templates are configured on and evaluated by TOAST

TOAST Legacy - Multiuser IV

gempa

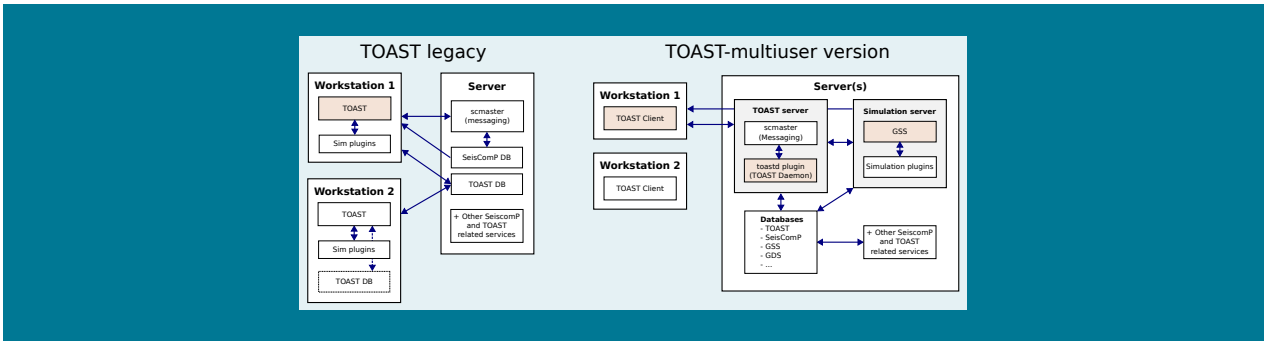
TOAST-multiuser version



- Automatic incidents and simulations are triggered by TOAST server
- Only TOAST server writes to TOAST database
- Simulations are computed on Simulation server GSS
- Results are retrieved by TOAST client from TOAST daemon and GSS
- Connection between client and servers can employ authentification
- Templates are configured on TOAST server and evaluated by TOAST client

4.2 Using SeisComP control for TOAST server

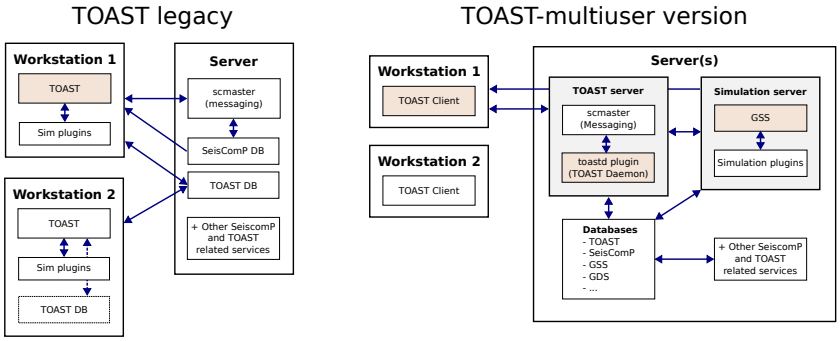
Using SeisComP control for TOAST server



Dr. Andreas Hoechner and TOAST team

gempa GmbH, Potsdam, Germany

TOAST - transition to multi-user version



- TOAST has been transitioned to a client/server architecture.
- Thus, it has been split in three components:
  - The server components TOAST server and GSS
  - and the TOAST client.
- The server components are managed like other SeisComP automatic modules using SeisComp control.

SeisComP Control I

gempa

- A SeisComP automatic module is started using:
  `seiscomp start modulename`
- and stopped using:
  `seiscomp stop modulename`
- Note: If server and client are installed on the same machine but in different directories, shell aliases `sc-proc` and `sc-gui` are typically used to differentiate:
  - `sc-proc` (or just `seiscomp`) refer to the server,
  - `sc-gui` to the client.

SeisComP Control II

gempa

- To show whether a specific or all modules are running:
  `seiscomp status [modulename]`
- Modules which were started but stopped with an error show a warning.
- Modules can be *enabled*:
  `seiscomp enable modulename`
- To start *all enabled* modules:
  `seiscomp start`
- To stop all enabled modules:
  `seiscomp stop`

SeisComP Control III

gempa

- To list the status of all enabled modules (and not the disabled ones):
  `seiscomp status enabled`
  (shell alias: `sc-status` on the test system).
- To restart all modules which failed with an error:
  `seiscomp check`
  This will not restart enabled modules which were *stopped*.
- To restart a specific or all enabled modules:
  `seiscomp restart [modulename]`
  This will restart enabled modules even if they were stopped.
- Typically a cron job is added to start the enabled modules after system start and to check every 3 minutes.
  (crontab -l)

SeisComP Control IV

gempa

- For help on seiscomp control commands:
  `seiscomp help` and more specifically: `seiscomp help commandname`
- If an automatic module does not start, it ca be useful to execute it in the shell (console) in foreground with debug log level output:
  `seiscomp exec modulename --debug`
- Note: *seiscomp exec* runs the module with the SeisComP environment variables.
- Note: SeisComP GUI applications (like TOAST client) are not started in background using *seiscomp start* (use `seiscomp exec`).
- seiscomp control can also be done using scconfig:
  `seiscomp exec scconfig`

Useful shell shortcuts

gempa

- *Arrow up/down*: iterate last commands.
- First letter(s) of command and then *Page up*: iterate last commands with same start letters.

Exercise

gempa

- Show which modules are enabled.
- Show which modules are running (hint: use `seiscomp list` and `help`).
- Stop a module and show again.
- Kill a module and show again (hint `ps aux | grep modulename` then `kill processID`.
- Do seiscomp check on the killed module.
- Show running modules.
- Restart the stopped module.
- Show running modules.

4.3 Important directories

gempa

SeisComP: Important Directories

Dr. Bernd Weber, Dr. Dirk Rößler & Enrico Ellguth

gempa GmbH, Potsdam, Germany

Outline

gempa

General Directory Structure: $SEISCOMP_ROOT

gempa

```
seiscomp
├── bin/ ..... User binaries
├── etc/ ..... Application configurations
├── include/ ..... SDK includes
├── lib/ ..... Common library directory
├── sbin/ ..... System/service binaries
├── share/ ..... Data directory
└── var/ ..... Third party configurations, log and run-time data files
```

Reference variables:

- seiscomp - @ROOTDIR@ or in SHELL: $SEISCOMP_ROOT
- seiscomp/etc - @SYSTEMCONFIGDIR@
- seiscomp/etc/defaults - @DEFAULTCONFIGDIR@
- seiscomp/share - @DATADIR@

Configuration Directory Structure: etc

gempa

- Define any module parameters
- Module configurations inherit parameters from global.cfg

```
seiscomp
└── etc/ ..... Application configurations
    ├── global.cfg
    ├── [module].cfg
    ├── descriptions/ ..... XML module descriptions
    ├── defaults/ ..... Application default configurations
    ├── init/ ..... Init/config scripts
    ├── inventory/ ..... Inventory XML files
    └── key/ ..... Station key files and bindings
```

Binding Directory Structure: key

- Use bindings for station-specific configurations, e.g., data acquisition and archiving, phase picking
- Bindings parameters take priority over module configurations.

```
seiscomp
└── etc/ ..... Application configurations
    └── key/ ..... Station key files and bindings
        ├── station_NET_STA ..... Station key file with bindings
        ├── global ..... Global bindings
        │   ├── station_NET_STA ..... Station binding file for global
        │   └── profile_name ..... Binding profile file for global with profile name
        ├── scautopick ..... scautopick bindings
        ├── seedlink ..... seedlink bindings
        └── slarchive ..... slarchive bindings
```


Directory Structure: var (Third Party Modules)

```
seiscomp
└── var/ ..... Third party configuration
    ├── lib/ ..... Generated configurations and run-time data files
    │   ├── archive/ ..... Default waveform archive directory
    │   ├── arclink/ ..... Native ArcLink configuration
    │   ├── seedlink/ ..... Native seedlink configuration
    │   ├── slarchive/ ..... Native slarchive configuration
    │   └── spread/ ..... Native spread configuration (SeisComP3 only)
    ├── run/ ..... Run and PID files of applications
    └── log/ ..... Start log of applications
```

Directory Structure: share

```
seiscomp
└── share/ ..... Data directory
    ├── db/ ..... SQL scripts
    ├── deps/ ..... Linux library install scripts
    ├── doc/ ..... Documentation
    ├── fdsnws/ ..... FDSNWS web files
    ├── licenses/ ..... license files for gempa modules
    ├── locsat/ ..... LOCSAT tables
    ├── maps/ ..... Default maps directory
    ├── plugins/ ..... Plugin directory
    ├── scalert/ ..... Alert scripts
    ├── scautoloc/ ..... scautoloc config files
    └── templates/ ..... Template directory for SeedLink, ArcLink and slarchive
```


User Configuration and Log Files

```
/home/sysop/.seiscomp
├── [module].cfg ..... any module configuration - use only exceptionally
├── key/ ..... SeisComP3 license directory - ignored in SeisComP
├── log/ ..... Logging directory
│   └── events/ ..... Event logging directory
└── [...] ..... other custom files and directory - use only exceptionally
```

- **Reference variables:**
  - /home/sysop/.seiscomp - @CONFIGDIR@
  - /home/sysop/.seiscomp/log - @LOGDIR@
- User configurations in /home/sysop/.seiscomp take **priority** over configurations in $SEISCOMP_ROOT/etc/.
- User configuration may be **used by operators** if otherwise installed with administrator permissions, e.g., in /opt/seiscomp.
- scolv GUI saves configuration in /home/sysop/.seiscomp **not** in $SEISCOMP_ROOT/etc/!

4.4 Configuring SeisComP

4.4.1 Configuring SeisComP using scconfig

The user friendly `scconfig` by gempa GmbH is recommended for configuring the SeisComP system. The configurations should be made in **system mode** as shown by the monitor icon at the upper left corner. Clicking on this icon switches between **system mode** and **user mode**. In **user mode** the settings made in **system mode** will be over-ruled. Configurations made in user mode are visible in `scconfig` as variables with values on red background.

Hot keys (Tab. 1) can be used as in all other GUI application.

sequence	function
ctrl W	wizard
ctrl F	search for keywords
ctrl S	save all setting
ctrl R	reload
ctrl Q	quit

Table 1: List of hot keys in `scconfig`.

`scconfig` can be used to start and stop SeisComP modules or to enable or disable their start when SeisComP is started 4.1.

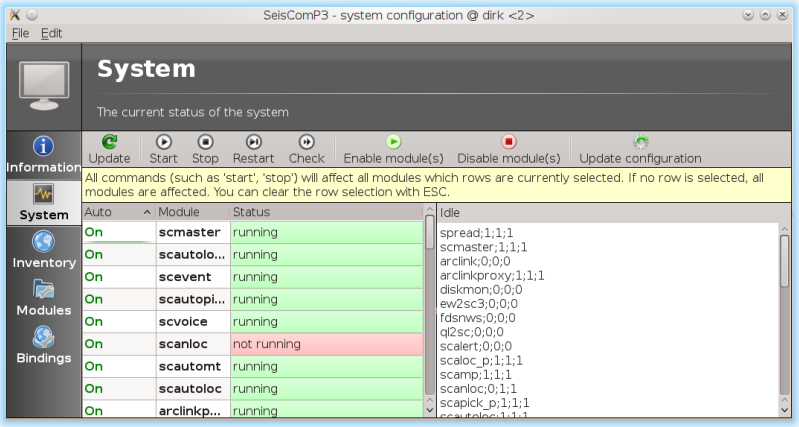


Figure 4.1: scconfig system panel. The system configuration can be updated, installed packages can be selected, stopped, started and restarted. Press ESC to work on all packages.

`scconfig` can be used to control the station inventory (Fig. 4.2). See the course material (Sec. 4 for details).

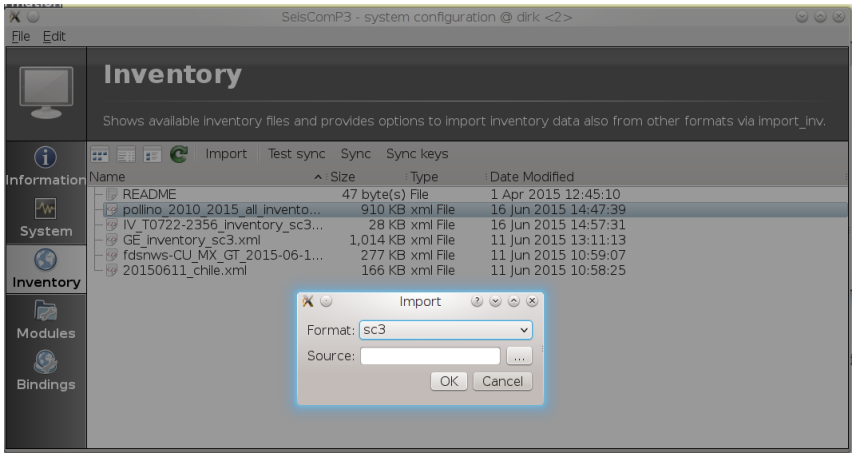


Figure 4.2: scconfig inventory panel. Station inventories can be imported and removed. Press Sync keys to synchronize the imported inventories, press Sync to write the key files to the SeisComP system. Do not forget to update the configuration in the system panel (Fig. 4.1)

4.4.2 Initial Setup

For easy initial setup of SeisComP after installation, `scconfig` provides a wizard (Fig. 4.3)

1. open setup wizard in `scconfig`:
   user@host:~$ `scconfig` -> File -> Wizard
2. follow the instructions

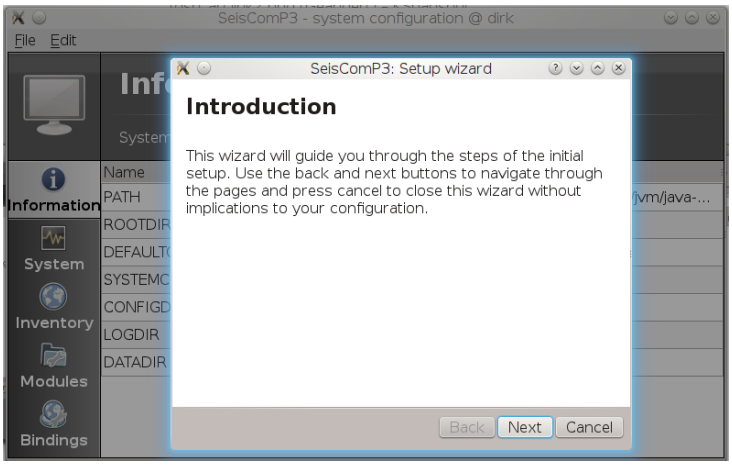


Figure 4.3: Install wizard of scconfig to set up SeisComP right after installation.

4.4.3 Operator IDs

Start with setting the identification of the organisation and the operator: (Fig. 4.4)
scconfig: Modules -> System -> global: datacenterID, agencyID, organisation, author

Figure 4.4: scconfig modules panel for configuration of the installed modules.

4.4.4 Customizations: Colors, Precisions, Lines, Fonts

Many aspects that concern look-and-feel aspects of the SeisComP GUIs can be customized. Such aspects include, e.g.:

- Colors of picks, traces, stations,
- Fonts,
- Precisions of numbers,
- Time zones used for displaying the times,
- Distance units: km or degree,
- Foreground and background colors,
- Line widths.

These items can be freely customized. When using scconfig, identify and change the relevant parameters in the scheme section of the global module configuration or in the global section of the GUI module configuration.

For example, for setting the colors of traces, picks, stations, etc:
`scconfig`: Modules -> System -> global -> scheme -> color

Colors are given in hexadecimal values. Color representations can be found in several sources, e.g. in the internet on `http://html-color-codes.info`.

4.4.5 Event IDs

Event IDs are given to uniquely store the events.

Use scconfig to set the nomenclature of eventID given by scevent:
`scconfig`: Modules -> Modules -> scevent

- eventIDPrefix: leading name of the event ID
- eventIDpattern: "`%p%Y%04c`":

  - %p: pattern of prefix,
  - %Y: time string in bash format (see `date -h` for more options),
  - %04c: digit identifier (c-style), can be modified to change the string length of the identifier. The identifier associates the source time of an event to a string. The string length corresponds to the coarseness of the time sampling. Example: one year has about 31536000 seconds, divided by 26^4 time intervals (4 character string, 26 letters) results in intervals of 69 seconds.
    Add more letters if events are expected closer in time.

- exclude event IDs by blacklisting.

4.4.6 Plugins

Plugins may enhance module functionality. They are loaded one during start of a module. They can be added to individual or all modules by the global `plugin` parameter.

Example:

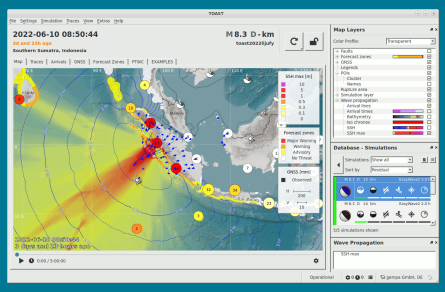
**user@host:~$** `scconfig` Modules=>System=>global=>plugins="${plugins},mapprojections,saic,spickdbg,mlh,hypo71"

The value `${plugins}` is prepended to also load all previously configured plugins. Without `${plugins}`, only the given plugins are loaded.

4.5 Tsunami Background

gempa

Tectonics, Earthquakes, Tsunami and Modeling



Marit Möller, Dr. Dirk Rößler, Dr. Bernd Weber, Dr. Andreas Hoechner

gempa GmbH, Potsdam, Germany

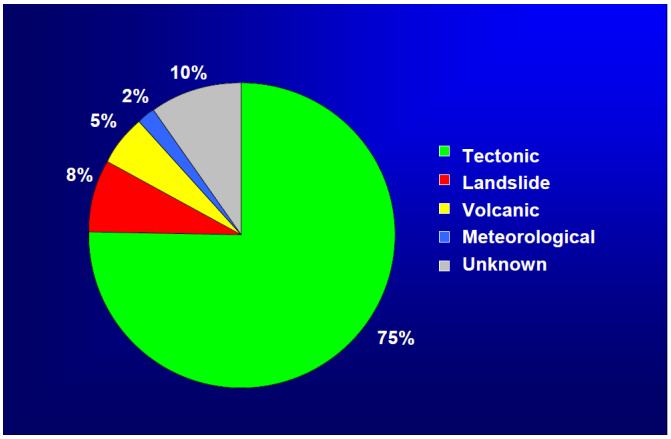
Outline

gempa

Tsunami Sources

gempa

Most tsunami are generated by earthquakes



Source: Gusiakov

- Earthquakes (75%)
- Landslides
- Volcanoes
- Tropical cyclones
- Meteorites

Earthquake Distribution and Plate Tectonics

gempa

Most earthquakes occur at plate boundaries and are caused by tectonic plate motion

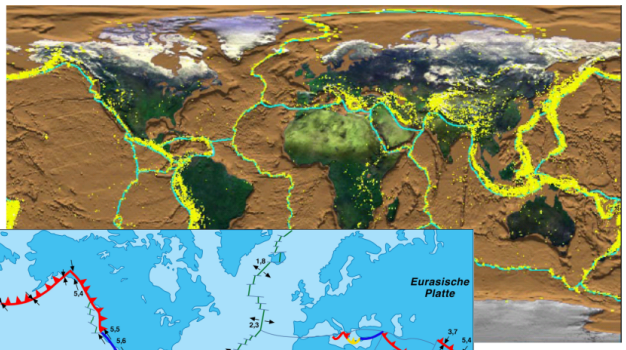


Image: Humboldt University

Image: GFZ

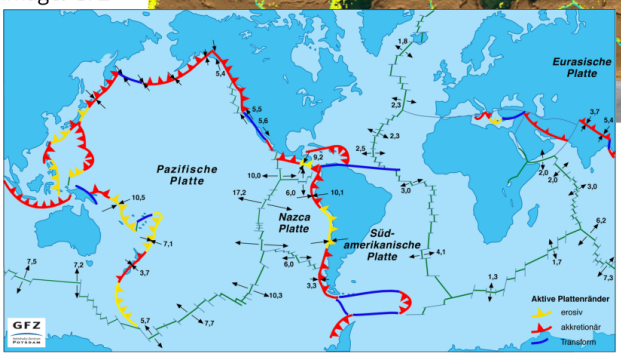


Image: wikipedia.org

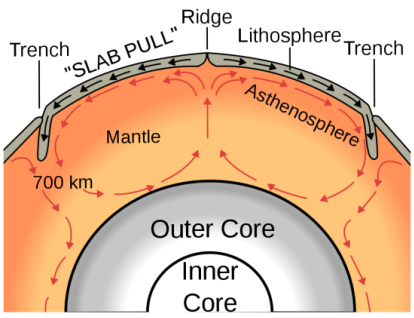
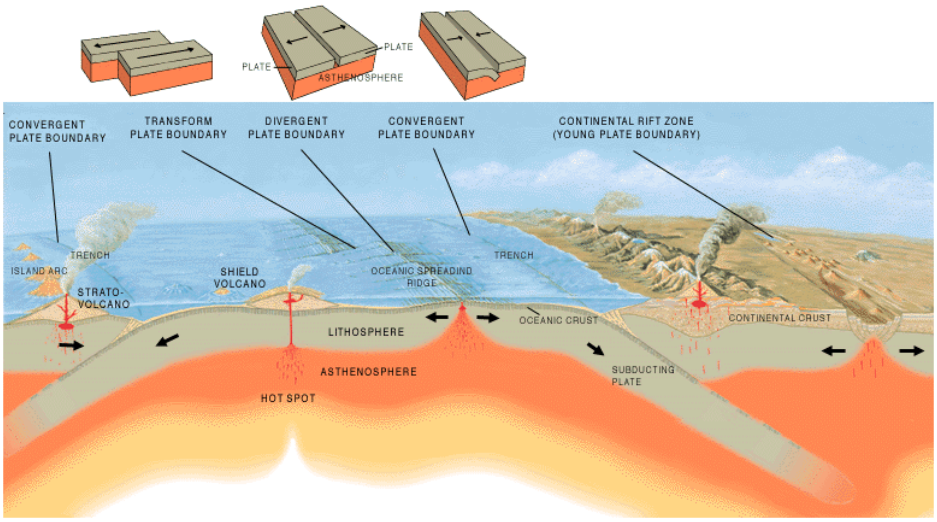


Plate Boundary Types

gempa

The largest earthquakes occur at subduction zones

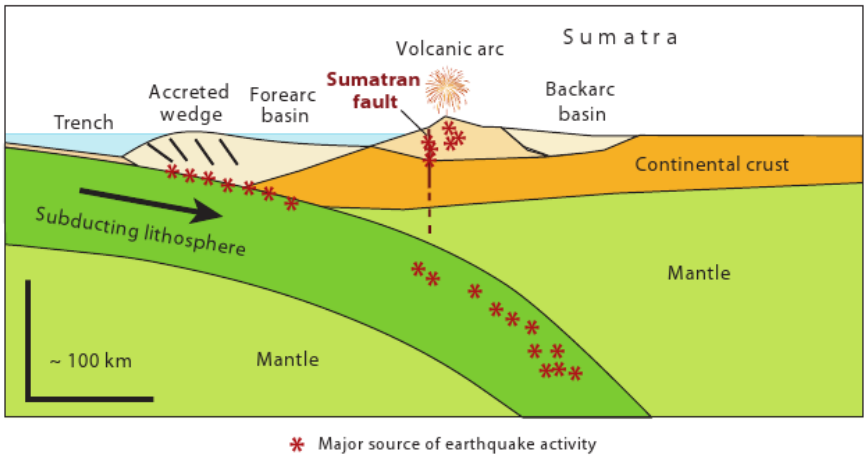


Source: wikipedia.org

Subduction Process

gempa

Stress builds up between earthquakes and is released during event

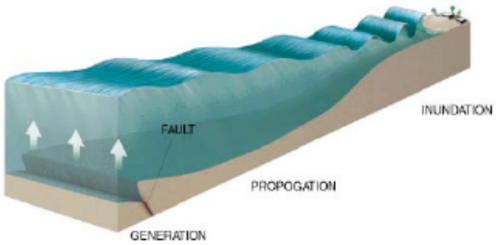


Source: McCaffrey 2009

Tsunami Generation I

gempa

Tsunami modeling involves several steps



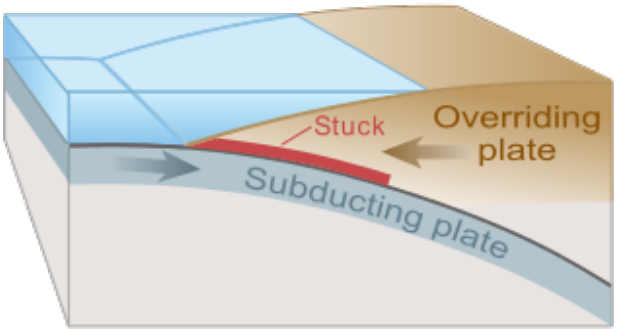
Source: Imamura 2005

- Tsunami generation: Initial condition
- Tsunami propagation: Shallow water equations
- Tsunami run-up and coastal inundation: High resolution, 3D (feasible for hazard assessment but not for early warning)

Tsunami Generation II

gempa

Tsunami earthquake mechanism: Initial situation



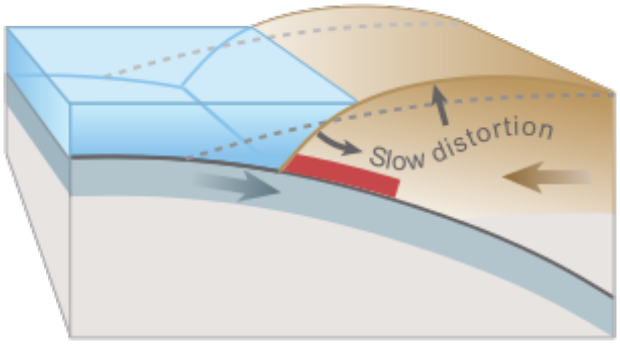
Source: wikipedia.org

Tsunami Generation III

gempa

Tsunami earthquake mechanism: Stress buildup

Slow deformation (years to centuries)



Source: wikipedia.org

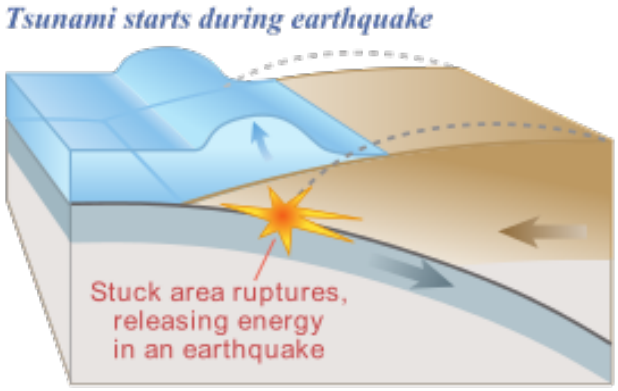
Tsunami Generation IV

gempa

Tsunami earthquake mechanism: Earthquake

Sudden deformation of sea floor (also land) (seconds to minutes)

Strong vertical component, Tectonic stress release



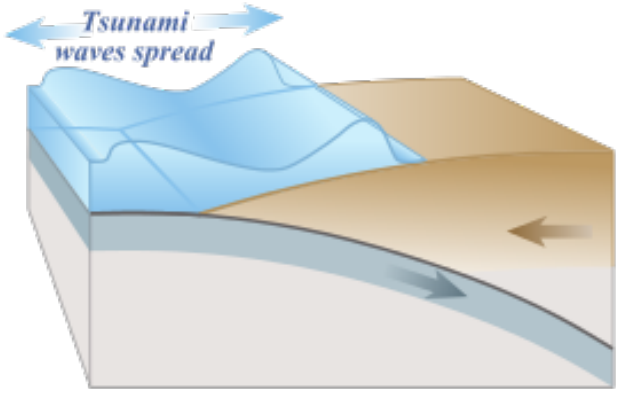
Source: wikipedia.org

Tsunami Generation V

gempa

Tsunami earthquake mechanism: Propagation as gravitational wave

Note: Tsunami is not caused by earthquake-induced shaking

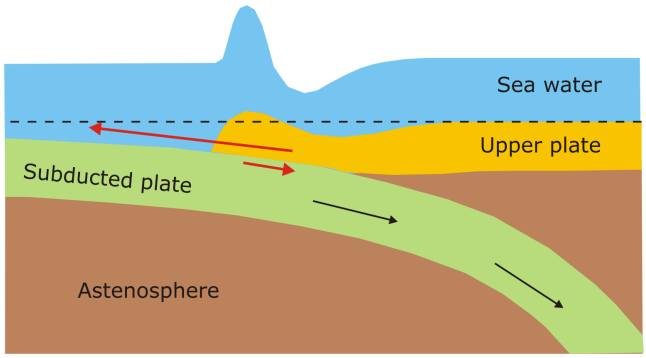


Source: wikipedia.org

Tsunami Generation VI

gempa

Co-seismic slip

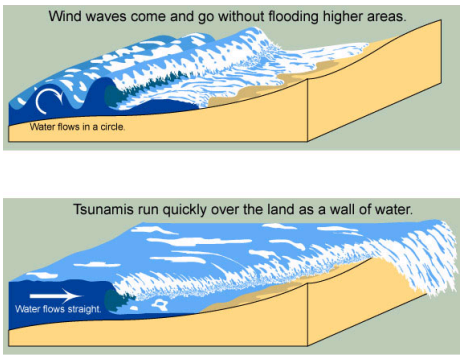


- Co-seismic slip is responsible for rapid sea floor deformation and hence tsunami generation
- Post-seismic slip causes slow sea floor deformation: no tsunami

Tsunami Generation VII

gempa

Tsunami impact



- Contrary to many artistic images, most tsunami do not result in giant breaking waves
- Rather, they come in like very strong and fast tides
- Much of the damage inflicted by tsunami is caused by strong currents and floating debris

Fault Plane Parameters I

gempa

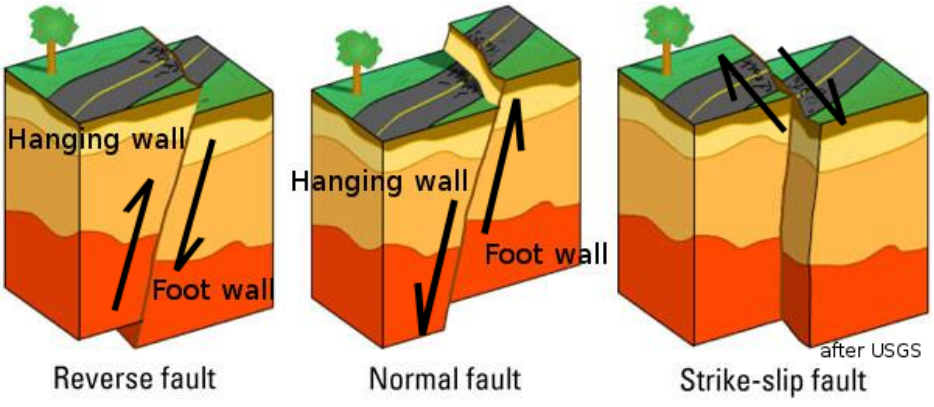
Rupture Mechanisms

- Vertical displacement required for tsunami generation
- Most likely by thrust, normal and dip-slip faulting

Shortening: subduction, collision

Extension: spreading, graben

transform faults

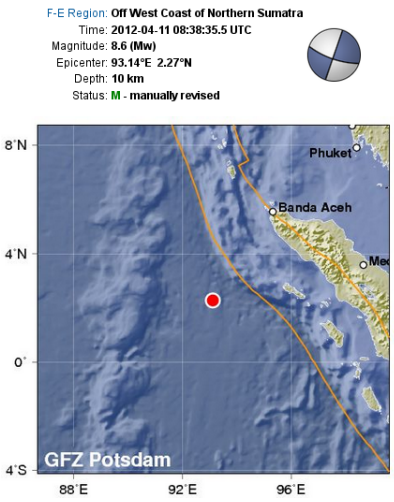


Fault Plane Parameters II

gempa

Strike-Slip earthquakes

- **On land:** continental transform faults, e.g.
  - San Andreas fault
  - Sumatra fault
  - Dead Sea fault
- **In oceans:** transform faults between ridge segments, e.g. Mid-Atlantic Ridge
- **Tsunamigenic potential:** very low
- **Reason:** strike slip events produce almost no vertical deformation of sea floor
- Examples:
  - M7.2, Haiti Region, 12 January 2010
  - M8.6, Off West Coast of Northern Sumatra, 11 April 2012

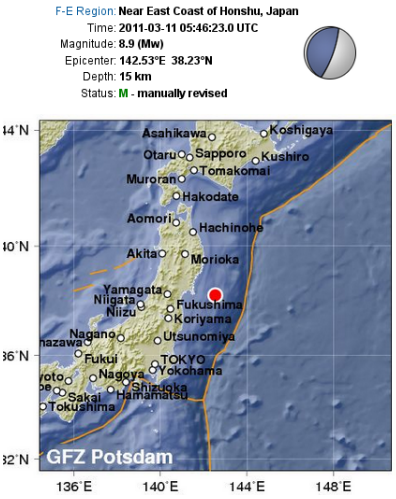


Fault Plane Parameters III

gempa

Dip-slip, thrust faulting

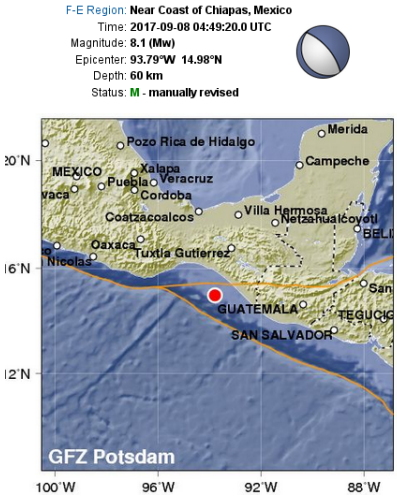
- Caused by tectonic compression, shortening
- On land: in many places by orogenesis
- In ocean: subduction zones near the trench
- **Tsunamigenic potential:** very high
- Many events with large magnitude, e.g.
  - M9.3, Northern Sumatra, 26 December 2004
  - M8.0, Sichuan, 12 May 2008
  - M8.6, Near East Cost of Honshu, Japan, 11 March 2011



Fault Plane Parameters IV

Normal faulting

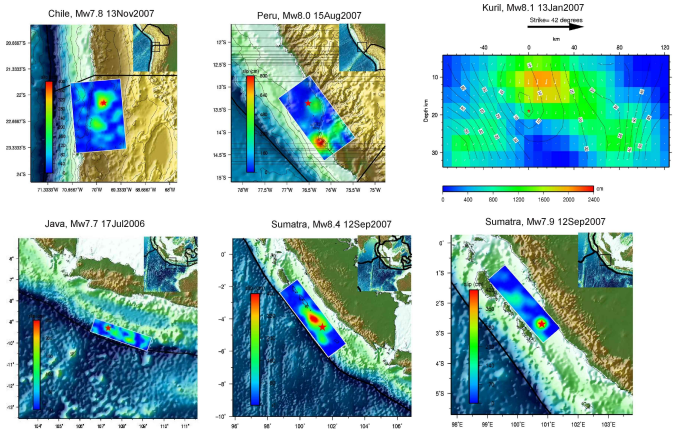
- Caused by extension
- On land: in many places by orogenesis, rift zones, subsidence due to mining
- In ocean: outer rise and rifting at mid-ocean ridges
- **Tsunamigenic potential:** very high
- Fewer events with large magnitudes, e.g.
  - M8.1 Off-coast Mexico, 08 September, 2017
  - M8.1 East of Kuril Islands, 13 January 2007



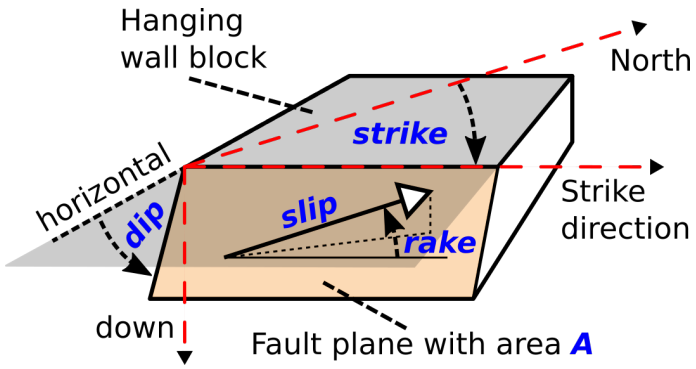
Fault Plane Parameters V

Rupture area and slip distribution

- Focal mechanisms: assume point sources and homogeneous slip
- Large events have finite extent and inhomogeneous slip distribution



Fault Plane Parameters VI



- Dip angle δ: $0^\circ \leq \delta \leq 90^\circ$
- Strike angle Φ (azimuth): $0^\circ \leq \Phi < 360^\circ$
- Rake angle λ: $-180^\circ \leq \lambda \leq 180^\circ$
- Slip amount s in m
- Area A in m^2
- Shear modulus $\mu \approx 30\,GPa$
- Moment $M_0 = \mu \cdot s \cdot A$ in Nm
- Magnitude $M_w = \frac{2}{3} log_{10} M_0 - 6.03$

Fault Plane Parameters VII

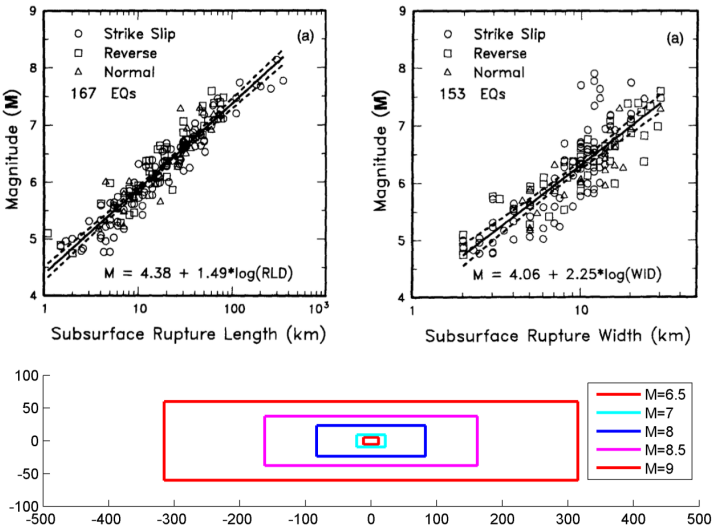
Fault parameterization (sometimes called Okada parameters)

- **Position**: Latitude, Longitude, Depth (Note: reference is not always center of fault)
- **Size**: Length and Width (from scaling relations, see next slide)
- **Orientation**: Strike and Dip angles (from MT or tectonic setting)
- **Relative motion**: Rake angle and Slip amount
- There is an analytical solution to compute the deformation caused by the fault for the homogeneous elastic half-space (Okada, 1985)

Fault Plane Parameters VIII

gempa

Scaling relations



Wells and Coppersmith 1994

Shallow Water Equations I

gempa

Linear shallow water equations 1D

$$\frac{\partial u}{\partial x} d + \frac{\partial h}{\partial t} = 0 \qquad \text{Balance of mass}$$

$$\frac{\partial u}{\partial t} + g\frac{\partial h}{\partial x} = 0 \qquad \text{Balance of momentum}$$

$$\Rightarrow \frac{\partial^2 h}{\partial t^2} = gd\frac{\partial^2 h}{\partial x^2} \qquad \text{Wave equation}$$

- With h: wave height, u: horizontal velocity, d: water depth, g: gravitational acceleration ($= 9.81\,\mathrm{m/s^2}$)
- Note: Solution (h and u) depends on one single variable: water depth d
- Wave length has to be long compared to water depth

Shallow Water Equations II

gempa

Numerical schemes and codes

- Finite differences on **structured grids**
  - Pro: easy to implement, robust, simple grids, parallelization of computation
  - Contra: constant resolution, needs nested grids in coastal regions if higher resolution requested
- Examples for tsunami simulation codes:
  - https://docs.gempa.de/toast/current/apps/easywave2.html
    EasyWave: GFZ Potsdam (integrated in TOAST)
  - https://edanya.uma.es/hysea/index.php/models/tsunami-hysea
    HYSEA: Malaga University, Spain
  - http://www.tsunami.civil.tohoku.ac.jp/hokusai3/J/projects/manual-ver-3.1.pdf
    TUNAMI: Tohoku University, Japan
  - https://nctr.pmel.noaa.gov/model.html
    MOST: NOAA, USA
  - https://icomcot.twgrid.org/index.html
    COMCOT: Academia Sinica, Taiwan

Shallow Water Equations III

gempa

Numerical schemes and codes

- Finite elements on **unstructured grids**
  - Pro: single computational domain for deep-ocean propagation and inundation
  - Contra: time consuming, stability problems, complex grid creation and tuning
- Examples for tsunami simulation codes:
  - https://tsunami.awi.de
    TsunAWI: Alfred Wegener Institute, Germany (available for TOAST)
  - https://github.com/GeoscienceAustralia/anuga_core/wiki
    ANUGA: Geoscience Australia
  - https://epic.awi.de/id/eprint/19669/1/Pra2008a.pdf
    TsunaFlash: Bremen University, Germany
- For a comparison see
  https://epic.awi.de/id/eprint/45421/1/ITS2017Bali_HarigEtAl.pdf
  Modeling Approaches InaTEWS

Shallow Water Equations IV

gempa

Remarks

- In Tsunami Early Warning (TEW) context, uncertainty caused by source is often larger than by propagation model
- For TEW it is preferable to have a simple but fast code in order to be able to asses many source models
- A general rule of thumb for numerical modeling states that 10% model accuracy increase costs 90% of efforts

Tsunami Properties I

gempa

Tsunami Propagation Speed

- Speed v of the tsunami depends on water depth d: $v = \sqrt{g * d}$ with $g = 9.81\,\text{m/s}^2$ (gravitational acceleration)
- **Deep ocean:** very fast, well over 800 km/h (air plane)
  Example: $d = 5000\,\text{m} \Rightarrow v = 797\,\text{km/h}$
- **Shallow water:** slower, may be below 80 km/h
  Example: $d = 50\,\text{m} \Rightarrow v = 80\,\text{km/h}$
- **Exercise:** Calculate the tsunami speed depending on depth:

Depth [m]	Speed [km/h]	Depth [m]	Speed [km/h]
10000		200	
5000		20	
2000		10	

Tsunami Properties II

gempa

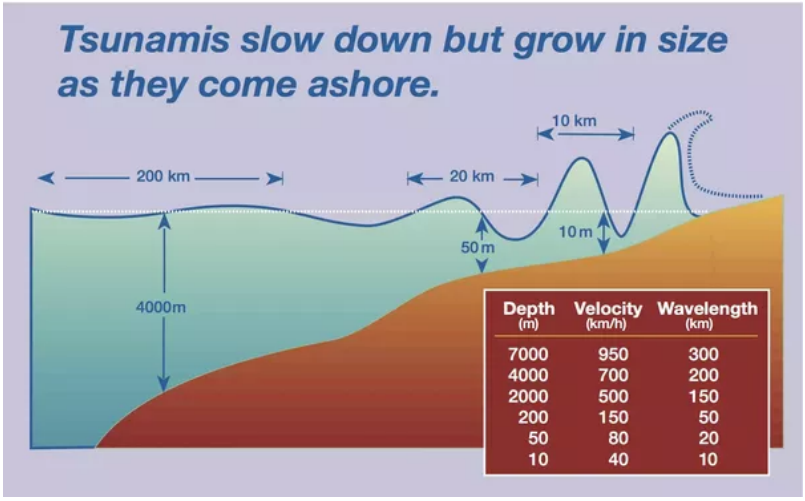
Wave Lengths / Periods

- Normal ocean waves have a wavelength of only 30 or 40 m
- Everyday wind waves have a wavelength (from crest to crest) of about 100 m and a height of roughly 2 m
- Tsunami has in deep ocean a wavelength of up to 200 km and periods of up to 20 to 30 minutes
- In shallow water the wavelength diminishes to less than 20 km
- The very long periods remain in shallow water

Tsunami Properties III

gempa

Wave Lengths / Periods



Source: https://qph.ec.quoracdn.net

Tsunami Properties IV

gempa

Tsunami Wave Height

- Tsunami wave heights h depend on water depth d: wave heights increase in shallow waters
- **Deep ocean:** small amplitude (wave height), very long wavelength – often hundreds of kilometres long
- **Deep ocean:** they generally pass unnoticed, forming only a slight swell. Typical value: 30 mm (12 in) above normal sea surface
- **Shallow waters:** tsunami heights grow when reaching shallower waters
- **Open bays and coastlines** adjacent to very deep water may shape the tsunami further into a step-like wave with a steep-breaking front.
- Tsunamis may occur at any tidal state, inundating coastal areas even at low tide.
- Except for the very largest tsunami, the approaching wave does not break, but rather appears like a fast-moving tidal bore.

Tsunami Properties V

gempa

- **The period** of the tsunami wave is not changed $\Rightarrow$ it may take minutes to reach full height
- **Green's law** for long wavelengths, only 1-D and close to the coasts:

$$\frac{h_S}{h_D} = \left(\frac{d_D}{d_S}\right)^{1/4},$$

  With: h: Wave height, d: Water depth, S: Shallow, D: Deep
- Non-linear relation in shallow water: calculation by shallow-water equations
- Simulation methods use linear or non-linear equations
- **Examples:**
  - $d_D = 5000\,\text{m}$, $h_D = 1\,\text{m}$, $d_S = 50\,\text{m} \Rightarrow h_S = 3.2\,\text{m}$
  - $d_S = 10\,\text{m} \Rightarrow h_S = 4.7\,\text{m}$

Tsunami Properties VI

gempa

Exercise: Calculate the tsunami wave height using Green's law:

Deep water		Shallow water	
d_D [m]	h_D [m]	d_S [m]	h_S [m]
4000	1	20	
200	1	20	
200		10	30
3000		10	30

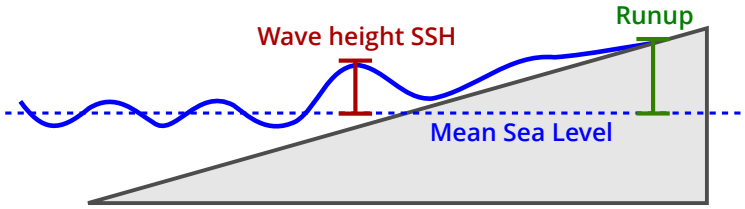
Green's law: $\frac{h_S}{h_D} = \sqrt[4]{\frac{d_D}{d_S}}$

With: h: Wave height, d: Water depth, S: Shallow, D: Deep

Runup definition and use in TOAST I

gempa

- Runup is defined as the height above mean sea level wich the wave reaches on land.



- Since Runup can not be computed directly with on-the-fly simulation tools like EasyWave, often an empirical approximation scheme is applied.
- Green's law is used to extrapolate the wave height from the last computation node to a water depth of 1 m and this value is assigned to Runup. The resulting formula is:
- $Runup = \sqrt[4]{d} \cdot H$ with d: Water depth at the last node, H: Wave height at the last node

Runup definition and use in TOAST II

gempa

- In TOAST using **EasyWave** as simulation backend, this formula is **applied to all forecast points and tide gauges**, also for their time series, but **not to buoys**.
- Note that there may be small deviations between Runup and T3 Value in Arrivals perspective. This is because the T3 Value is computed by TOAST based on time series output from EasyWave with typically 30 s sampling period, while Runup is directly output by EasyWave based on a smaller internal computation time step.
- Other simulation backends may use different definitions.

4.6 TOAST- What's new

gempa

New features of TOAST since 2022

Dr. Andreas Hoechner and Enrico Ellguth and Marit Möller

gempa GmbH, Potsdam, Germany

October 13, 2024

Outline I

gempa

TOAST development I

gempa

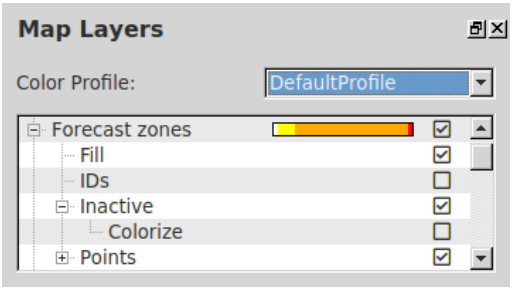
- TOAST is continuously being improved
  - in order to meet changing client requirements
  - to extend functionality
  - to streamline user interaction
  - to simplify configuration
- An extensive list of changes can be found in:
  - @DATADIR@/doc/toast/CHANGELOG
    or by:
  - TOAST → Documentation → Change Log
    or on the web:
  - https://docs.gempa.de/toast/current/base/changelog.html

On the following slides we focus on some of the important changes.

Colorize inactive forecast zones I

gempa

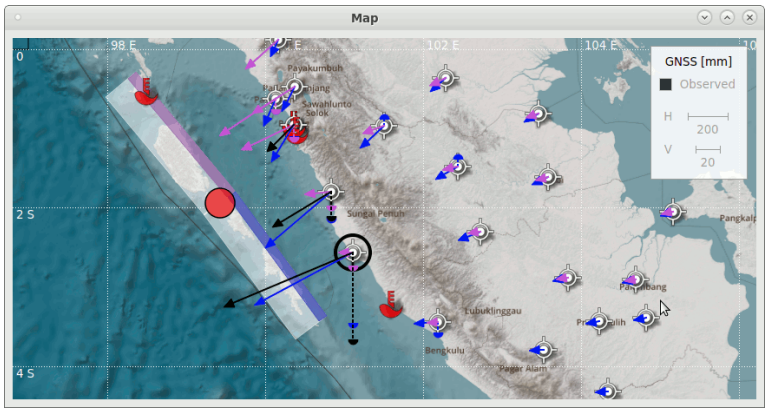
```
## 2022-03-21
### Added
- Add option in map layers and ClearSilver to colorize inactive forecast zones
   with the lowest warning level color
```



Coseismic displacements (GNSS) I

gempa

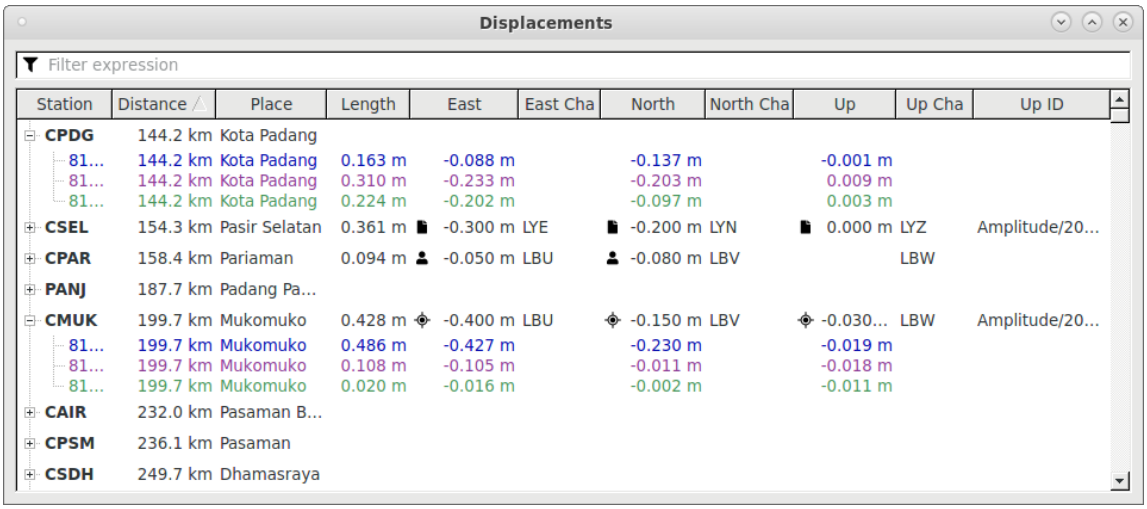
```
## 2022-05-17
With this release, the TOAST GNSS displacement functionality is fully implemented.
Displacements are received by messaging or imported from XML or set manually.
A Displacement residual is computed by comparing these displacements with those computed
by simulations like EasyWave. It is used as additional ranking information
for the scenarios.
```



Coseismic displacements (GNSS) II

gempa

```
- Displacements perspective for observed and simulated displacements
```

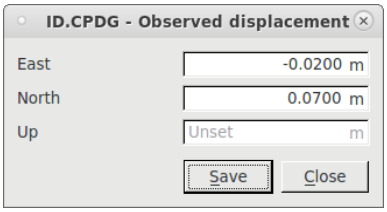


Station	Distance	Place	Length	East	East Cha	North	North Cha	Up	Up Cha	Up ID
CPDG	144.2 km	Kota Padang								
81...	144.2 km	Kota Padang	0.163 m	-0.088 m		-0.137 m		-0.001 m		
81...	144.2 km	Kota Padang	0.310 m	-0.233 m		-0.203 m		0.009 m		
81...	144.2 km	Kota Padang	0.224 m	-0.202 m		-0.097 m		0.003 m		
CSEL	154.3 km	Pasir Selatan	0.361 m	-0.300 m	LYE	-0.200 m	LYN	0.000 m	LYZ	Amplitude/20...
CPAR	158.4 km	Pariaman	0.094 m	-0.050 m	LBU	-0.080 m	LBV		LBW	
PANJ	187.7 km	Padang Pa...								
CMUK	199.7 km	Mukomuko	0.428 m	-0.400 m	LBU	-0.150 m	LBV	-0.030...	LBW	Amplitude/20...
81...	199.7 km	Mukomuko	0.486 m	-0.427 m		-0.230 m		-0.019 m		
81...	199.7 km	Mukomuko	0.108 m	-0.105 m		-0.011 m		-0.018 m		
81...	199.7 km	Mukomuko	0.020 m	-0.016 m		-0.002 m		-0.011 m		
CAIR	232.0 km	Pasaman B...								
CPSM	236.1 km	Pasaman								
CSDH	249.7 km	Dhamasraya								

Coseismic displacements (GNSS) III

gempa

- Input dialog to add observed displacements manually

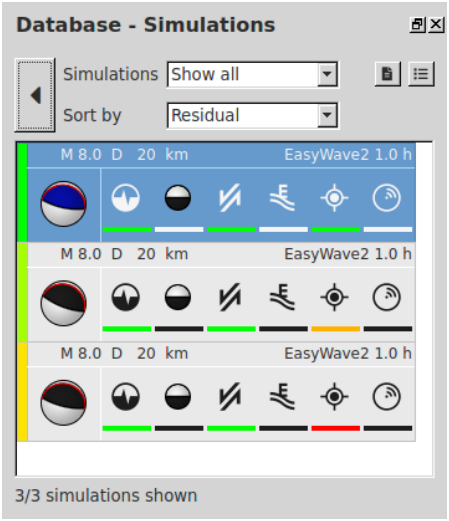


- Make observed displacement color configurable via color gradient

Coseismic displacements (GNSS) IV

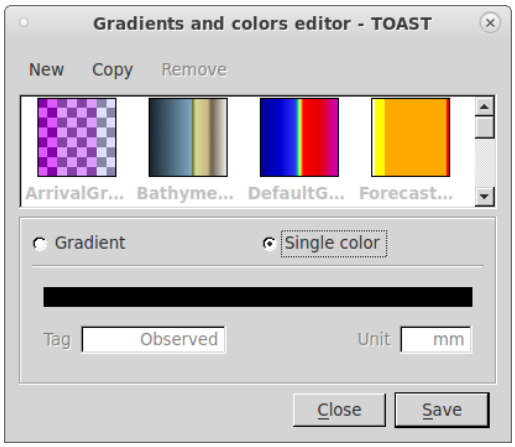
gempa

- Displacement residual calculation to compare simulated and observed displacements and rank simulations



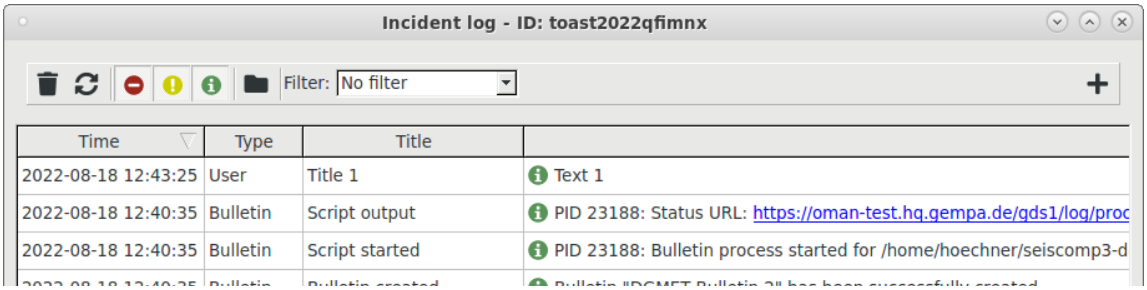
Color editor I

```
## 2022-06-20
## Changed
- Add color editor to edit single colors in the gradient editor
  in addition to gradients.
```



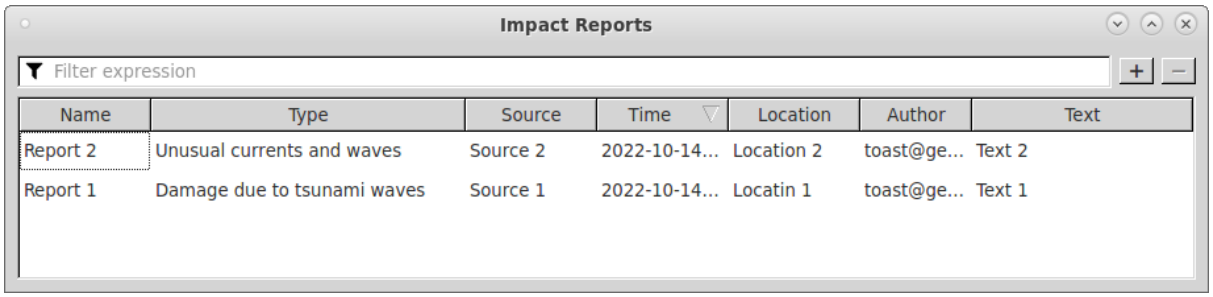
GDS feedback I

```
## 2022-06-24
## Added
- If a bulletin is disseminated using the gempa dissemination server GDS, then a
  link to the GDS log web interface is returned and displayed in the incident log.
- Standard error and standard output of external bulletin processes can
  be logged. By default logging to standard error is activated.
```



Impact reports perspective I

```
## 2022-07-26
## Added
- Tsunami impact reports perspective. The new view allows to add, remove and
  edit impact reports in text form. These are associated with an incident.
  The reports can contain information like for instance observed damage due
  to tsunami waves. Similarly as for Arrival or Forecastzone perspective,
  data can be exported via templates.
```



Configuration options I

```
## 2022-08-11
## Changed
- Consider 'maxFootWallDist' and 'maxHangingWallDist' deprecated,
  use 'maxFaultDist' instead.

## 2022-09-21
## Added
- New config option 'patches.extrapolateFault'. Selection of this
  extrapolates fault lines beyond their endpoints,
  so that they can provide patch generation information for
  epicenters otherwise not covered.

## Changed
- The TOAST database configuration parameter 'tsunami.database'
  replaces former parameters 'tsunami.database.type' and
  'tsunami.database.parameters' which have been removed.
```

Forecast zone ID duplicates check I

```
## 2022-09-21
## Added
- When reading the forecast zone shapefiles during startup, TOAST checks
  whether there are non-unique EX_BOX_IDs and lists those.

  These should be fixed, as otherwise the forecast points can not be
  associated correctly!
```

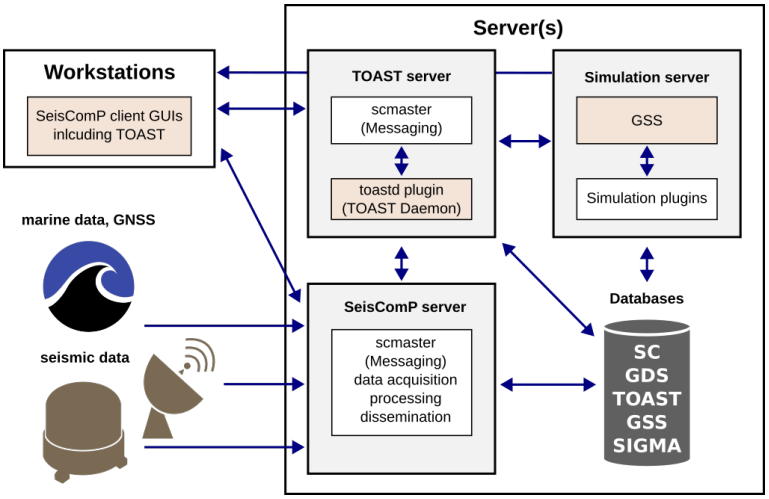

Other I

```
## 2022-05-17
- Added column 'distance' to Arrivals perspective with distance to origin in km
```

TOAST multiuser version I

gempa

New server - client architecture



- **Work station(s)**
  - Apply GUIs like TOAST, scolv, SIGMA, scmtv

- **SeisComP server**
  - automatic acquisition of multi-sensor data: seismic, oceanographic, GNSS
  - automatic earthquake solutions
  - moment tensors, ShakeMap: MT, SIGMA
  - dissemination: GDS
- **TOAST server**
  - process SeisComP events
  - trigger tsunami simulation on simulation server
- **Simulation server**
  - make, provide and store tsunami simulations

Template system I

gempa

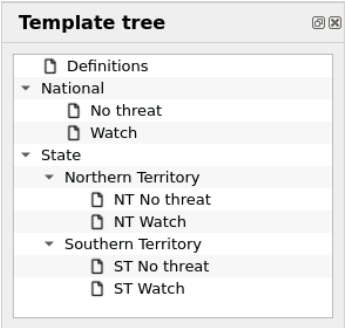
The template system has been reorganized

- Templates are configured at the server and form a template tree
- Live tabs are configured at the GUI with an entry point to the tree
- All templates are stored in the database together with the incident
- The templates can be edited using the template editor within TOAST
- Modifications affect only the current incident
- Additionally, template variables which can be configured and edited using a widget have been added

Template system II

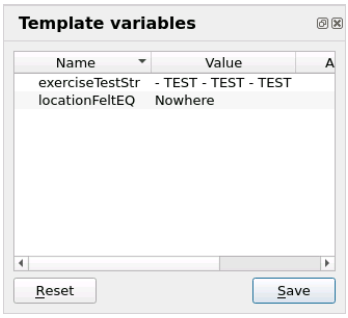
gempa

Template tree widget



- Shows template tree
- Edit templates using context menu

Template variables widget

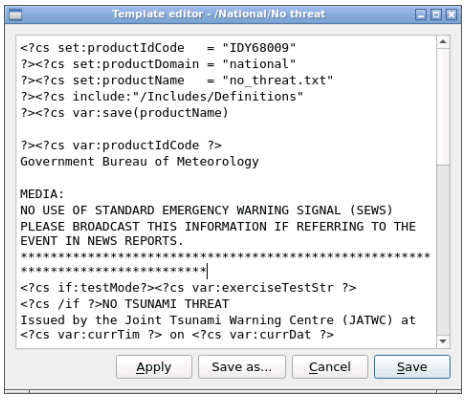


- Shows configured template variables and content
- Edit variables using context menu

Template system III

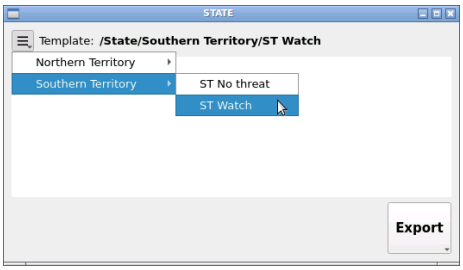
gempa

Template editor



- Edit templates within TOAST

Live tab

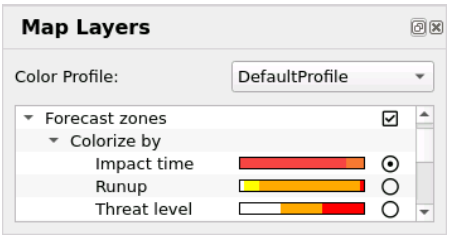


- Has arbitrary depth

Threat Level Mapping

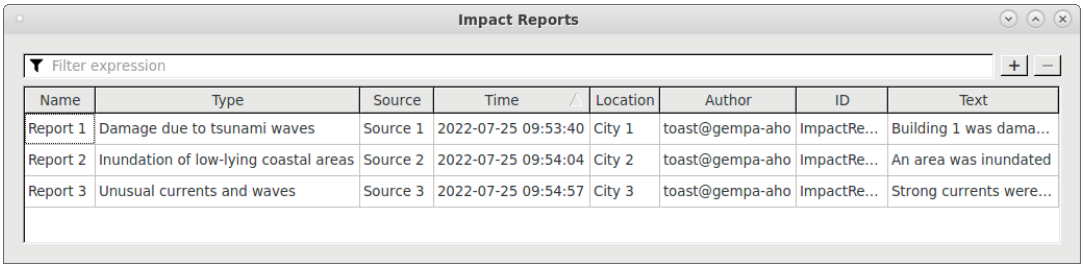
Forecast zone threat levels

- Up to now, forecast zones had the property *Runup*
- Threat level could be visualized using a color gradient
- Now, more complex definitions are possible via configuration
- Coloring can be done based on Runup, Threat level or Impact time
- Impact time is the span from current time to predicted tsunami arrival



Impact Reports Perspective

A new tab *Impact Reports* has been added to TOAST



Name	Type	Source	Time	Location	Author	ID	Text
Report 1	Damage due to tsunami waves	Source 1	2022-07-25 09:53:40	City 1	toast@gempa-aho	ImpactRe...	Building 1 was dama...
Report 2	Inundation of low-lying coastal areas	Source 2	2022-07-25 09:54:04	City 2	toast@gempa-aho	ImpactRe...	An area was inundated
Report 3	Unusual currents and waves	Source 3	2022-07-25 09:54:57	City 3	toast@gempa-aho	ImpactRe...	Strong currents were...

- Impact reports can be added to an incident
- The reports can be used in the templates for the bulletins

Other new features

gempa

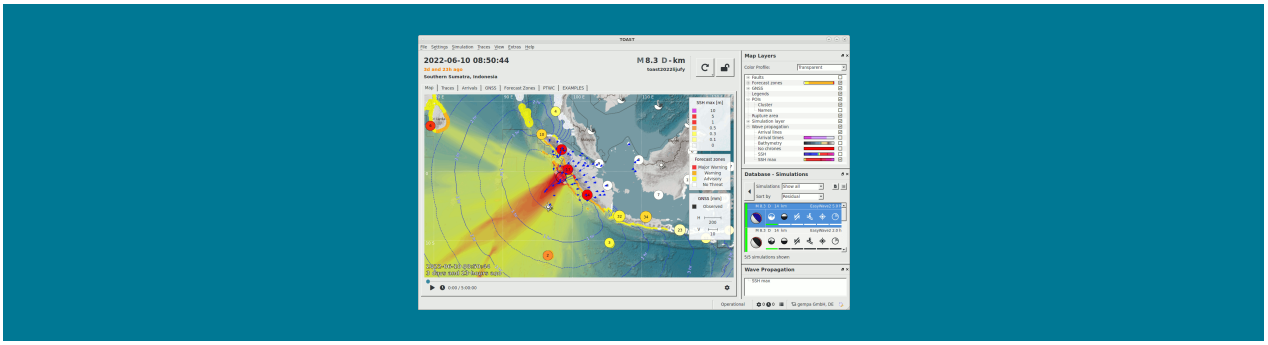
Other new features

- Editable incident source
- Non-seismic event types
- Creation and running of playback scenarios
- Effective magnitude
- Simulation selection by guidance
- Global and incident log
- Improved simulation symbol view
- ...

4.7 TOAST - Tsunami Observations And Simulation Terminal

gempa

Tsunami Observation and Simulation Terminal
TOAST



Marit Möller, Dr. Dirk Rößler, Dr. Bernd Weber, Dr. Andreas Höchner

gempa GmbH, Potsdam, Germany

Outline

gempa

Note on legacy and multiuser TOAST versions

gempa

Please note that this presentation has not yet been fully adapted to the new TOAST - multiuser version

- Most workflows for the operator using the graphical user interface (now: Client) are similar in both the legacy (non-multiuser version) and the new multiuser-version but differences may occur.
- The biggest change is that TOAST has been split in three components: the Server (TOAST daemon plugin of scmaster), the Simulation server GSS and the TOAST client.
- Some of the new features are not yet mentioned or shown in the screenshots of this presentation.
- For the new template system configuration and features consult the dedicated presentation TOAST - *Templates*.

TOAST - Introduction I

gempa

TOAST - Tsunami Observation and Simulation Terminal
... is a tsunami evaluation and decision support software

TOAST design goals:

- Evaluate the risk of tsunami generation using simulations
- Real-time processing and analysis of sensor data
- Dissemination of customized warnings and bulletins
- Provide a GUI for operator interaction

Multi-user requirements:

- Allow several users concurrently working on the same incident
- Shield the database from direct user access
- Enable user authorization
- Share simulations across workstations

TOAST - Introduction II

gempa

Features

- Complete integration into the SeisComP framework
- Automatic reception of earthquake parameters or non-seismic sources
- High scalability to run on a laptop but also on a high performance GPU system with multiple screens
- GPU based on-the-fly tsunami simulation
- Flexible interface to support any kind of tsunami simulation like pre-calculated databases and other algorithms
- Evaluation of simulations through integration of oceanographic sensor data

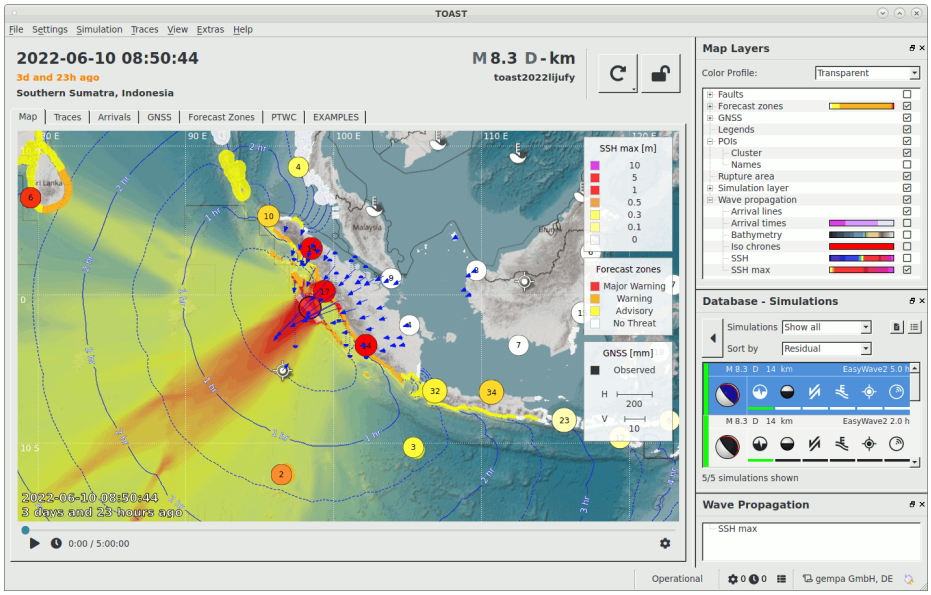
TOAST - Introduction III

gempa

Features

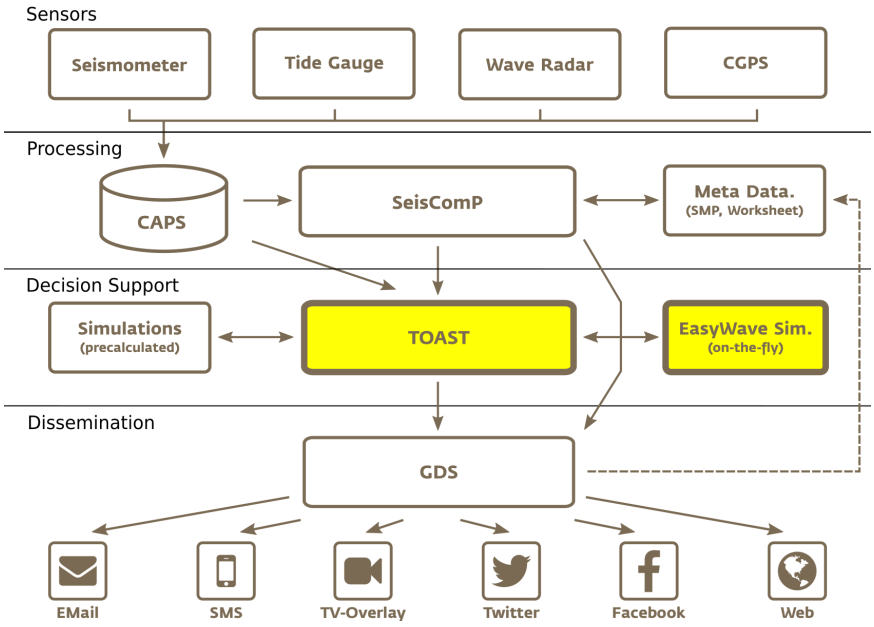
- Calculation of SSH, SSH max, isochrones, arrival times, coastal wave heights, Coseismic displacements (GNSS)
- Calculation of warning levels for forecast zones
- Automatic and interactive rupture generation
- Worst-case simulation aggregation
- Decision Support
- Template-based tsunami bulletin generation

TOAST - Introduction IV

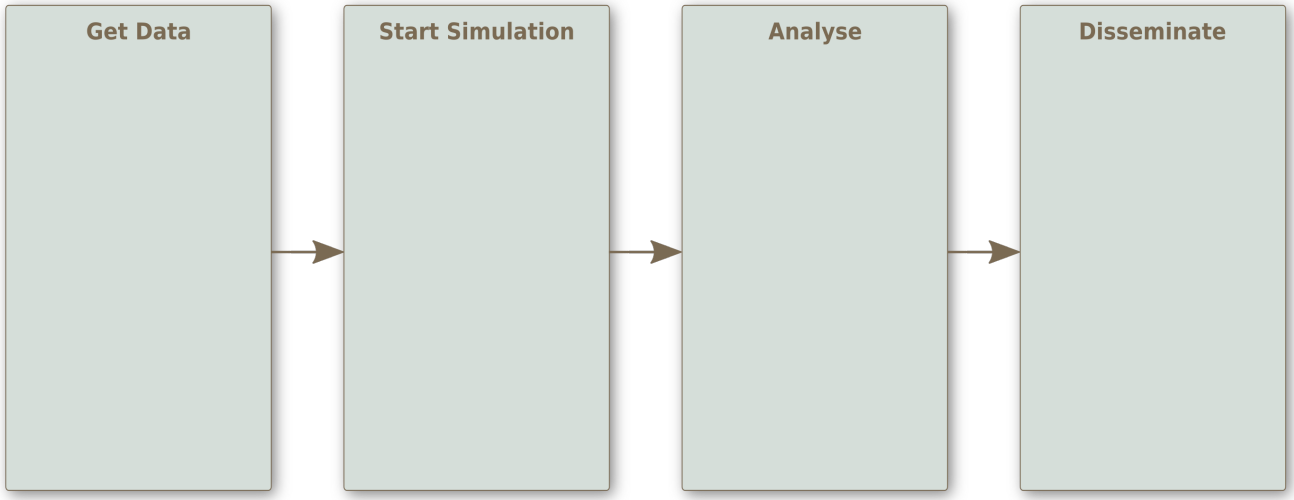


Toast overview

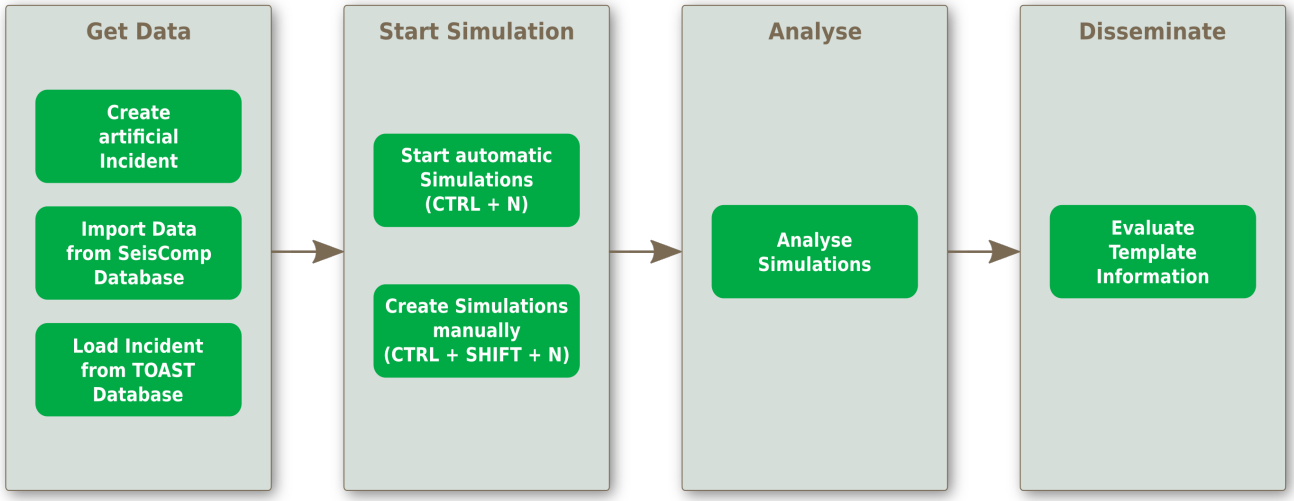
TOAST - Data Processing Flow



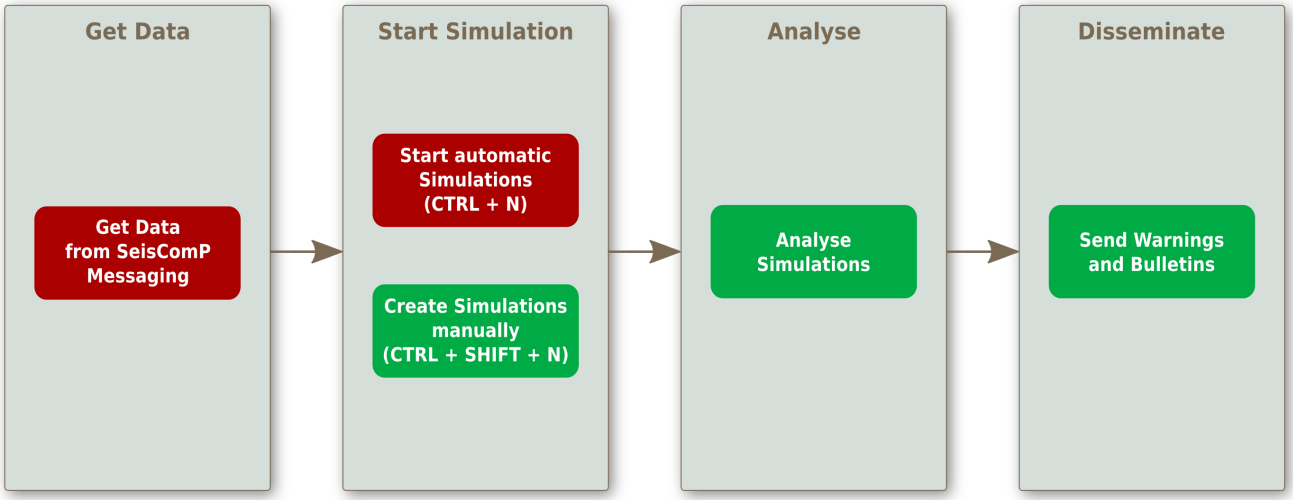
Workflow



Offline Workflow - no active Messaging



Workflow with active Messaging



Event in SeisComP vs. Incident in TOAST

Event: Object in SeisComP

- Origins
  - Latitude/Longitude
  - Depth
  - Time
- Magnitudes
- Focal mechanisms
  - Nodal planes
- Event type (Earthquake, Volcano, ...)
- Preferred origin
- Preferred magnitude
- Preferred focal mechanism

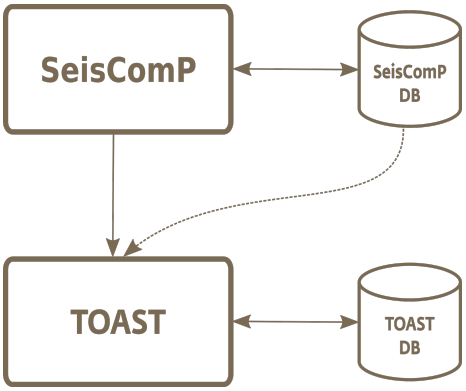
Incident: Object in TOAST

- ID of referenced or artificial Event
- Source parameters from referenced or artificial event:
  - Latitude/Longitude
  - Depth
  - Time
  - Magnitude
  - Nodal planes
- Simulations (EasyWave2, geowarettt, ...)
- Observations (Arrival times, GNSS displacements)
- Set of bulletin **templates**

Get Event/Incident Data in TOAST

gempa

- Get event information in 3 different ways:
  - **Messaging** connection to SeisComP:
    Incident is created automatically
  - **Database** connection to SeisComP:
    Event import and incident creation by user interaction
  - **Manual** incident creation:
    Artificial incident is created manually by user



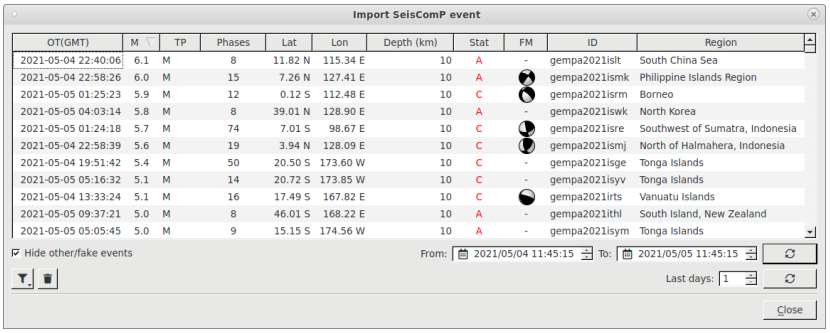
Automatic Incident creation via Messaging

gempa

- An event is received by TOAST daemon via messaging
- Depending on configuration, the TOAST daemon creates an incident
- Depending on configuration, the TOAST daemon triggers simulations
- The incident and the simulations are available in the TOAST client
- The user can manually add simulations

Import Event from SeisComP database

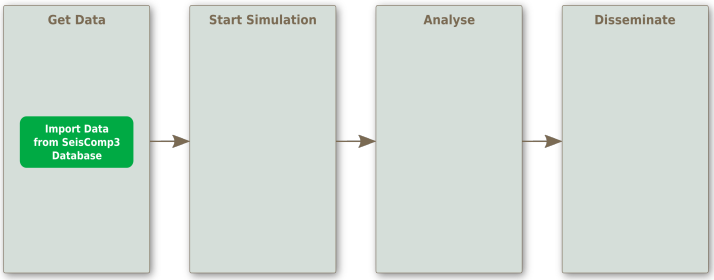
1. Open import dialog in menu *File* > *Import* > *From* SeisComP... or F4
2. Set date range *From* - *To* or *Last days*
3. Set magnitude, depth and location range by clicking on filter icon
4. Click reload icon
5. Double click on event in list to import it



SeisComP import dialog

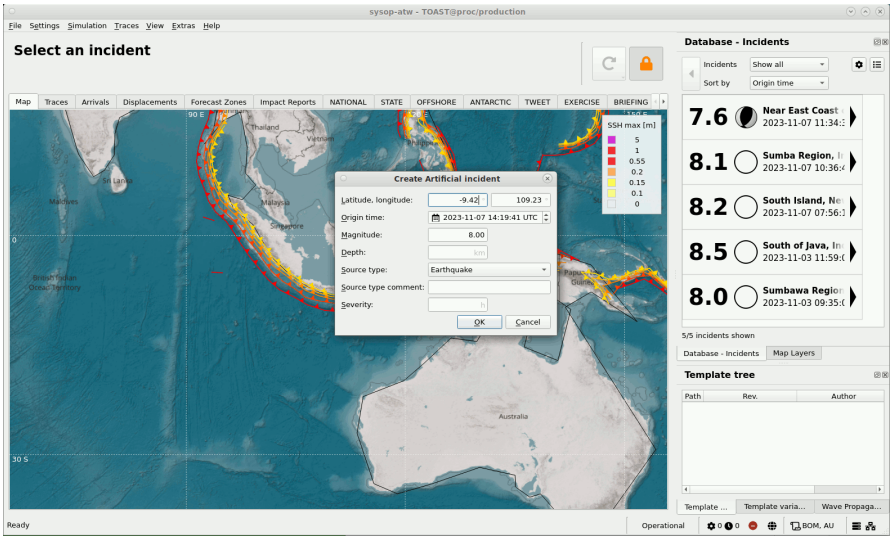
Exercise - Import Historical Events

1. Open SeisComP import dialog
2. Click filter button and set
   - magnitude > 5.0
   - depth < 50 km
3. Load events from the last 7 days
4. Use double click to load an event from list



Create Artificial Incident

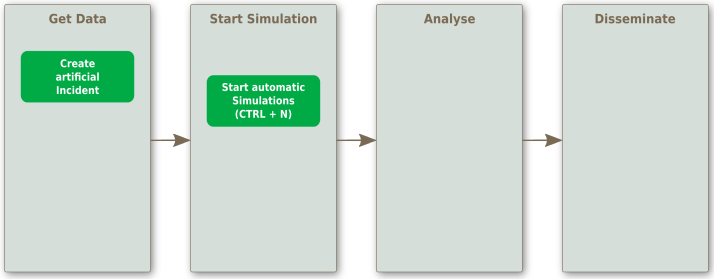
- Click on map with middle mouse button or
- Click on map with right mouse button and select via context menu
- Useful for training, testing, custom incident



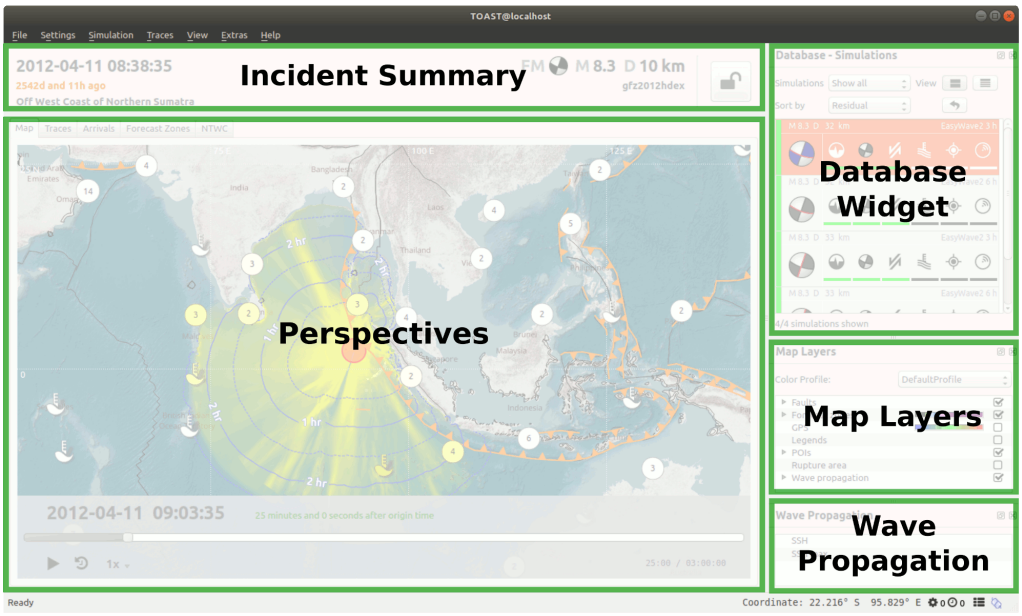
Artificial incident dialog

Exercise - First Simulation

1. Open the artificial incident dialog
2. Change the following parameters:
   - Latitude: 0.44
   - Longitude: 96.55
   - Magnitude: 7.5
3. Create the incident
4. Trigger the automatic simulation via the menu (*Simulations* > *Start*) or with CTRL + N

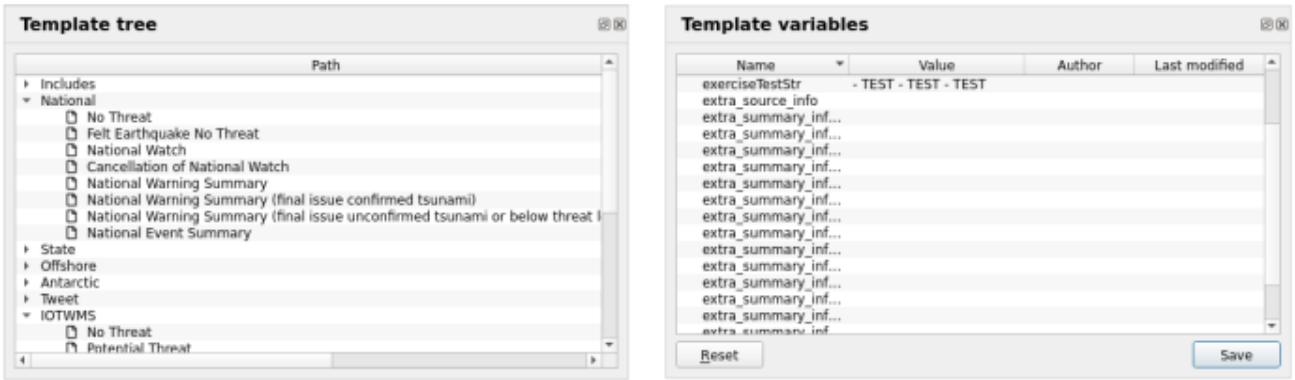


Graphical User Interface I

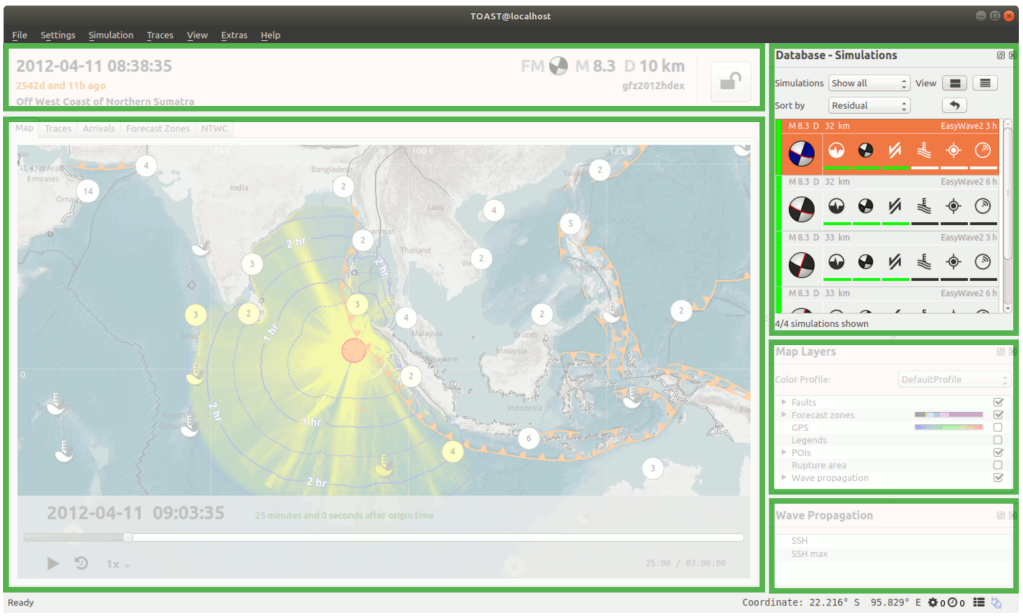


Graphical User Interface II

The TOAST-multiuser version has two additional widgets, the Template Tree and Variables:



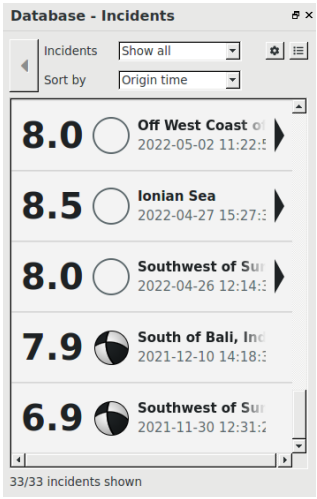
Database Widget



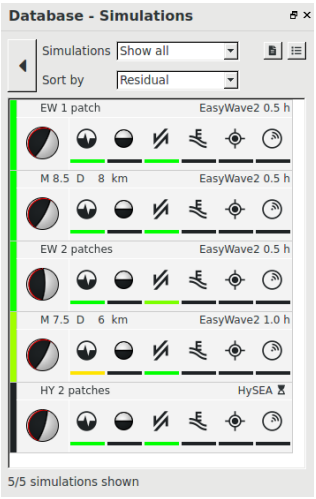
Database Widget

- Lists incidents
- View general parameters or details of incidents
- Select and view single incidents: Click on incident to show all simulations

Incident View



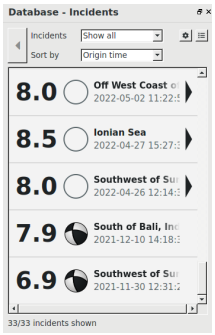
Simulation View



- Lists all simulations of one incident
- View general parameters or details
- Select single simulations
- Multi-select simulations
- Click on arrow left: Return to incident

Database Widget - Incident View

Symbols View for quick overview



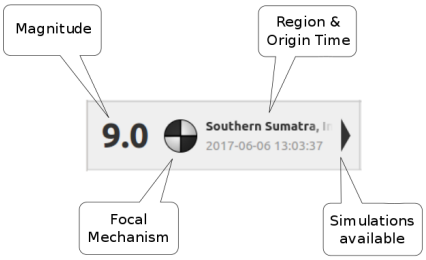
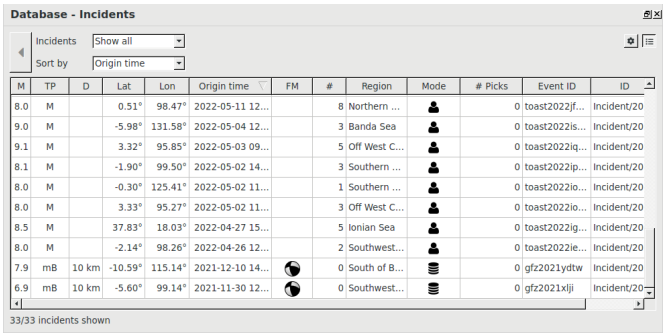


Table view with many details

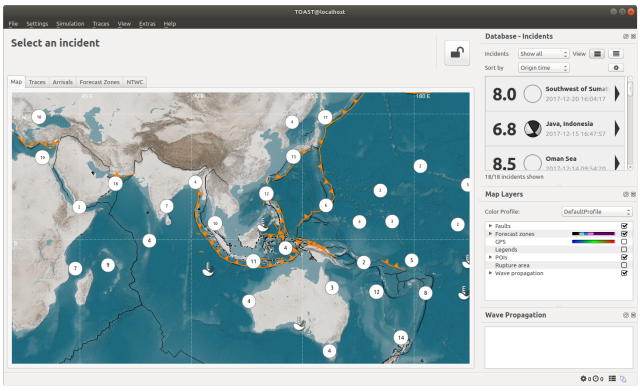


M	TP	D	Lat	Lon	Origin time	FM	#	Region	Mode	# Picks	Event ID	ID
8.0	M		0.51°	98.47°	2022-05-11 12...		8	Northern ...		0	toast2022jf...	Incident/20
9.0	M		-5.98°	131.58°	2022-05-04 12...		3	Banda Sea		0	toast2022is...	Incident/20
9.1	M		3.32°	95.85°	2022-05-03 09...		5	Off West C...		0	toast2022iq...	Incident/20
8.1	M		-1.90°	99.50°	2022-05-02 14...		3	Southern ...		0	toast2022ip...	Incident/20
8.0	M		-0.30°	125.41°	2022-05-02 11...		1	Southern ...		0	toast2022io...	Incident/20
8.0	M		3.33°	95.27°	2022-05-02 11...		3	Off West C...		0	toast2022io...	Incident/20
8.5	M		37.83°	18.03°	2022-04-27 15...		5	Ionian Sea		0	toast2022ig...	Incident/20
8.0	M		-2.14°	98.26°	2022-04-26 12...		2	Southwest...		0	toast2022ie...	Incident/20
7.9	mB	10 km	-10.59°	115.14°	2021-12-10 14...		0	South of B...		0	gfz2021ydtw	Incident/20
6.9	mB	10 km	-5.60°	99.14°	2021-11-30 12...		0	Southwest...		0	gfz2021xlji	Incident/20

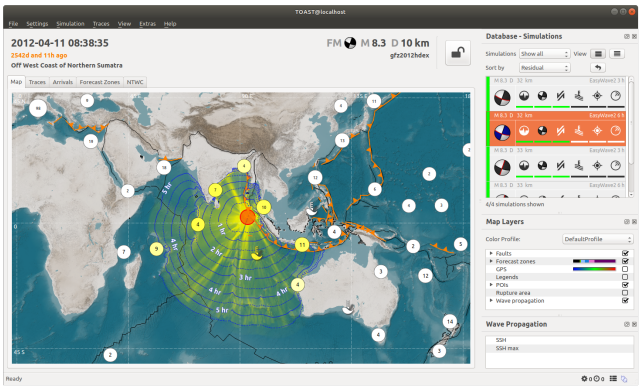
- Lists all incidents from TOAST database for the selected period of time
- Manipulators: sorting, quick filter
- Load incidents from TOAST database
- Selection by double click on item or row

Database Widget - Incident View vs. Simulation View

No selected incident - *Incident View* active



Selected incident - *Simulation View* active



- Select incident by double-click
- Leave incident by clicking left arrow (triangle) in database widget

Database Widget - Simulation View I

- Lists all simulations for the selected incident in symbol or table view
- Manipulators: sorting, quick filter
- Button to get back to *Incident View*
- Select simulation by double click on item or row
- Multiple selection of simulations: Press CTRL + double click on simulation

Symbols View for quick overview

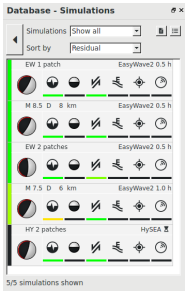
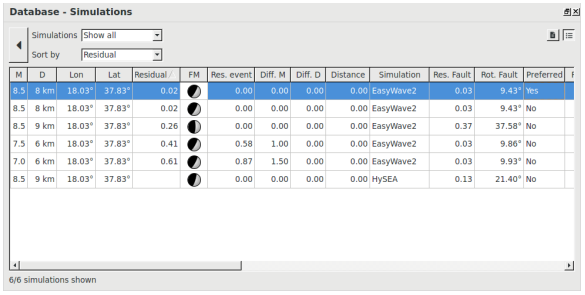
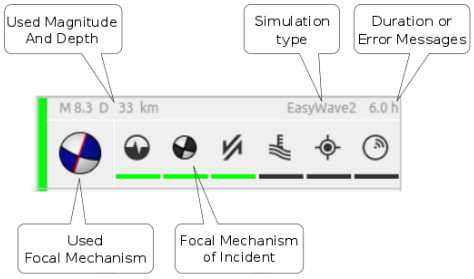


Table View for detailed information

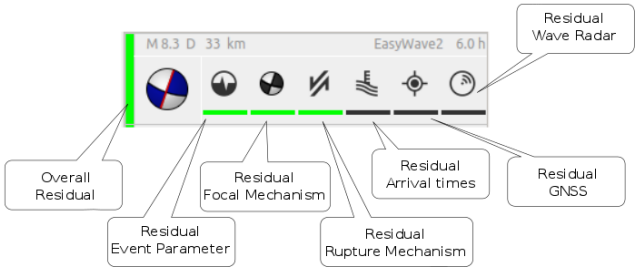


Database Widget - Simulation View II

Considered event parameters, simulation



Overall and relative residuals



Database Widget - Simulation View III

gempa

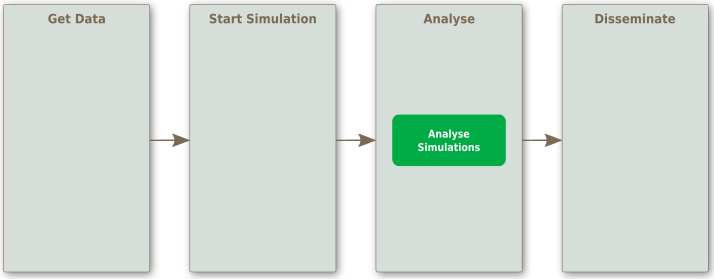
Ranking simulations

- Simulations are ranked based on **overall residual** for finding the most appropriate one(s).
- **Overall residual** is a weighted average from individual relative residuals of a simulation
- **Relative residuals:**
  - **Event Residual**: Combined from differences in magnitude and hypocentre of an event and parameters used for simulation. Event parameters are updated by SeisComP and refer to the latest preferred origin and magnitude.
  - **Focal Mechanism (FM)**: Preferred FM of an event vs. FM used for simulation.
  - **Rupture Mechanism**: Fault-plane parameters of the nearby known fault vs. the FM used for simulation.
  - **Tsunami Arrival**: Tsunami arrival times (picked) observed at tide gauges vs. simulation.
  - **Displacement**: Coseismic surface displacements observed at GNSS stations vs. simulation.
  - **Wave Radar**: Upcoming feature.

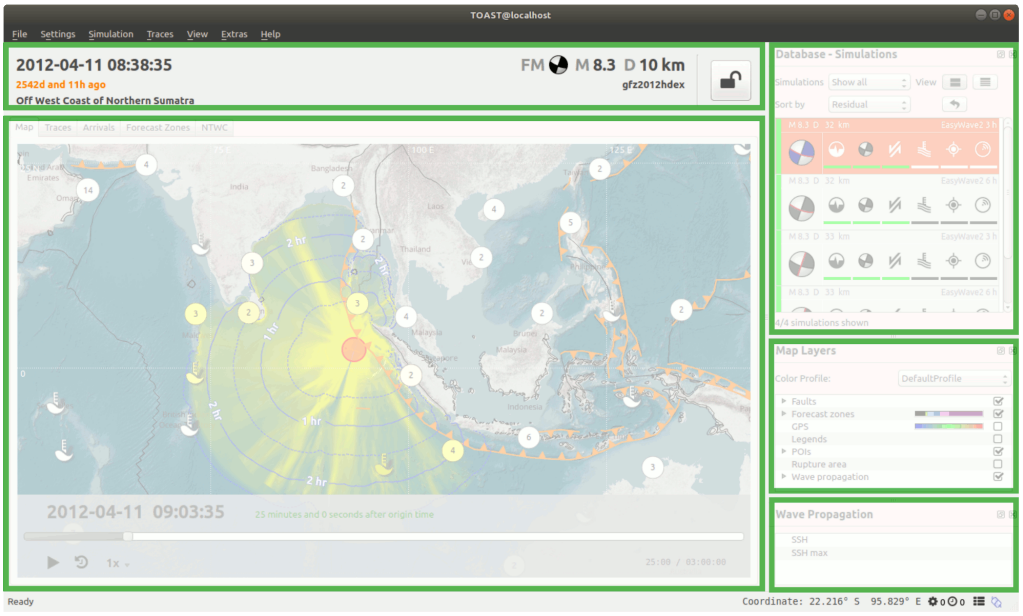
Exercise - Database Widget

gempa

1. From *Simulation View*, switch to the *Incident View* by clicking on the 'return' button
2. In the *Incident View* switch from symbols to the table view
3. Select the artificial incident from the first exercise by double click
4. Switch from symbols to the table view in the *Simulation View*
5. Sort simulations by *Creation Time*



Incident Summary I



Incident Summary II

No selected incident

Select an incident

Selected incident

2024-11-03 19:47:31
10m and 52s ago
South of Java, Indonesia (9.51° S 107.58° E)

FM M 8.6 D 10 km S 6 h
gempa2024vtbhnb (TEST)
Earthquake: Source comment

- Shows information of the selected incident:
  - Origin time, Time ago, Region and coordinates
  - Focal mechanism, Magnitude, Depth, Severity
  - Event or incident ID, Incident mode (None/Test)
  - Source type and Comment
- Lock button controls automatic incident switching
- Note: Update button for reloading event parameters is removed in TOAST-multiuser

Incident Summary III

gempa

New events received via SeisComP messaging create **new incidents and simulations**.

Unlocked Button

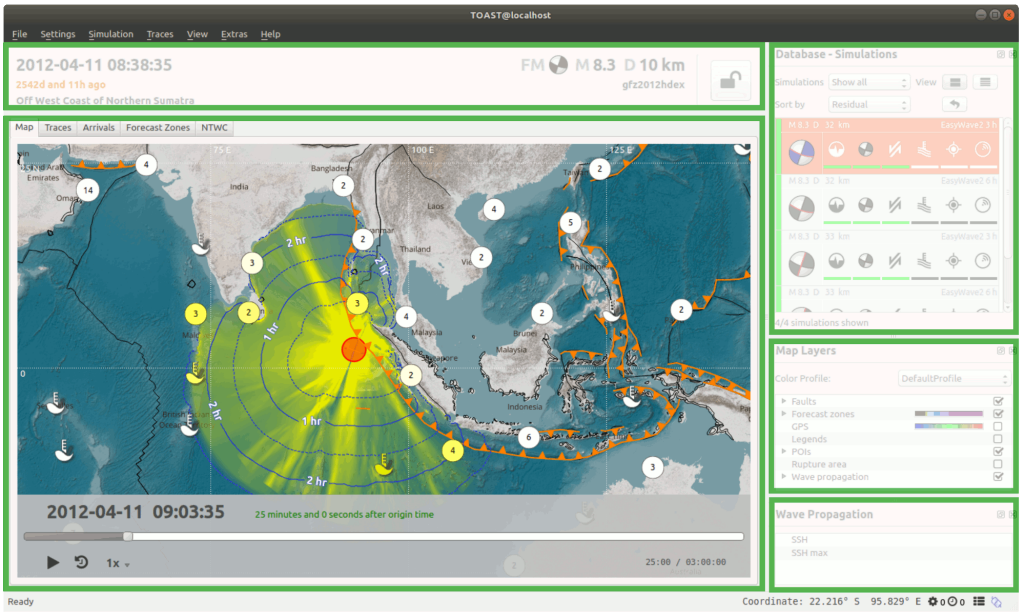
- New or updated incidents are *selected immediately and automatically*.

Locked Button

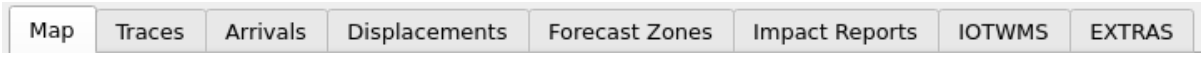
- The currently selected incident remains selected.
- Locking avoids disturbance during interactive operation.

Perspectives

gempa

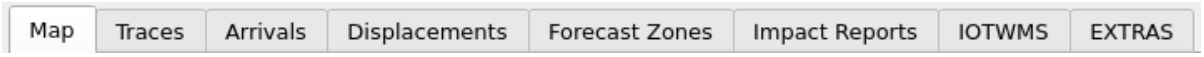


Perspectives and Live Tabs I



- **Map**
  - Shows map, origin, POIs, forecasts zones etc. and simulation results visually
- **Traces**
  - Waveform data for POIs in real time
- **Arrivals**
  - Lists triggered POIs and the corresponding simulation results
  - Open picker for comparing simulated with real data and setting observed data

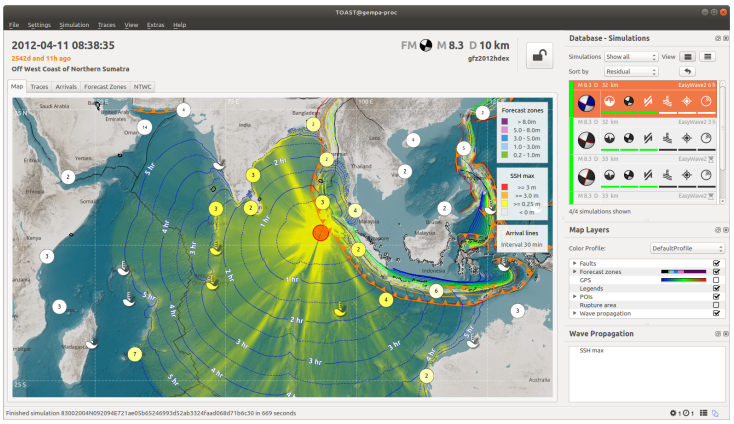
Perspectives and Live Tabs II



- **Forecast Zones**
  - Lists triggered forecast zones/points and the corresponding simulation results
- **Impact Reports**
  - Enter impact report observations
- **Live Tabs**
  - Configurable
  - Show rendered templates (bulletins) based on incident and simulation(s) selection
  - Technically entry point to template tree
  - Use to disseminate bulletins

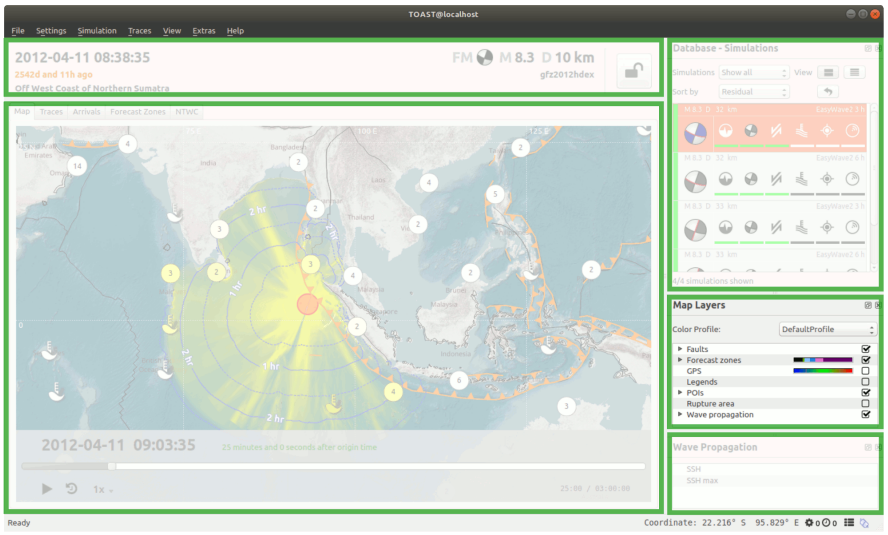
Perspectives - Map

Map Perspective shows simulated and observed tsunami features



- Simulation results:
  - SSH (Sea Surface Height)
  - SSHmax (Maximum Sea Surface Height over time)
  - Isochrones (Maximum extent of the tsunami at a certain time)
  - Arrival times and lines
  - Rupture areas used for simulation
  - Faults
  - Point of interest (POIs)
  - Forecast zones and forecast points
- Observed values:
  - Runup
  - Threat level
  - Displacement vectors

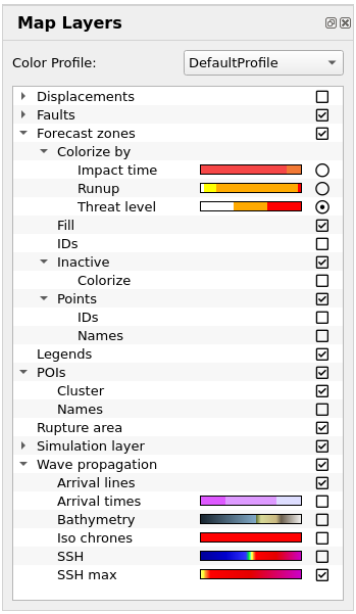
Map Perspective Control: Map Layers Widget I



Map Perspective Control: Map Layers Widget II

gempa

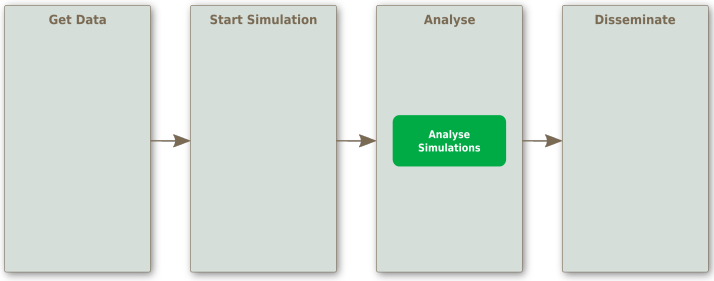
- Set visualisation features:
- Color Profiles
- Displacements (GNSS)
- Faults
- Forecast zones: **Colorize by**, Fill, IDs
- Legends
- POIs: cluster, names
- Rupture area
- Simulation layer
- Wave propagation



Exercise - Interacting with Map Features

gempa

1. Select the created simulation in the *Database View* with double click
2. Select in *Map Layer Widget*: *Forecast Zones* > *Points*
3. Click on colored forecast zone on the map
4. Enable and disable *POIs* > *Clusters* in *Map Layers Widget*
5. Select the *SSH max* and the *Arrival lines* layer in the *Map Layers Widget*
6. Deselect all others *wave propagation* layers (*Arrival times*, *Isochrones*, *SSH*)

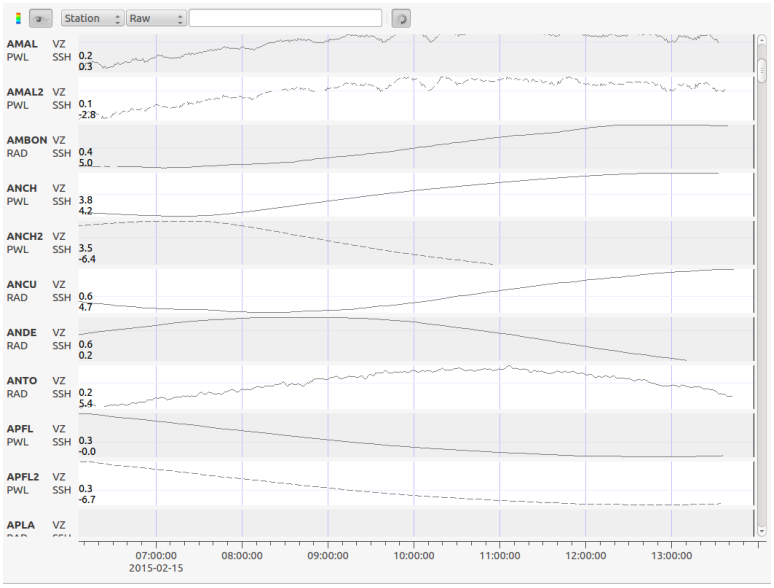


Perspectives - Traces

gempa

Real time view of data at POIs

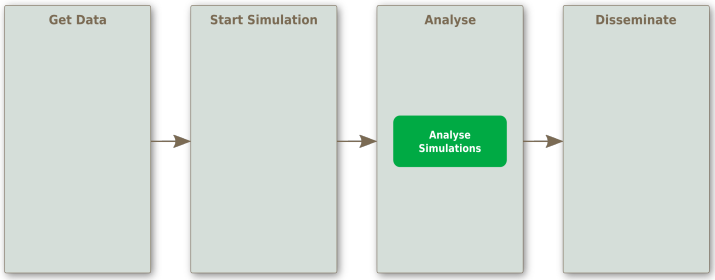
- Observe waveforms of POIs in real time
- Start acquisition by clicking on the 'arrow' button
- Filter data
- Show and control spectrograms
- Search streams



Exercise - Real Time Data

gempa

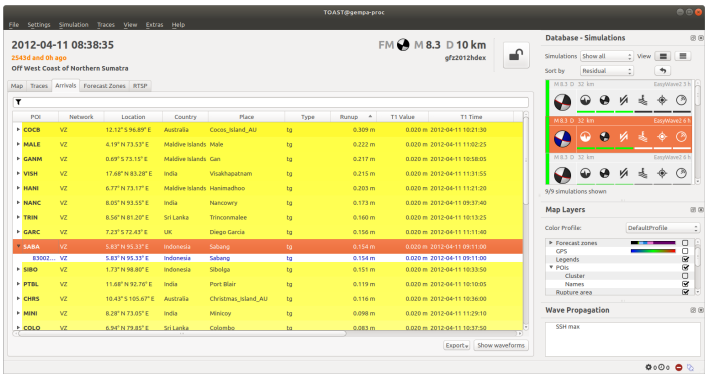
1. Open the *Traces Perspective*
2. Start the data acquisition by pressing the 'arrow' button
3. Select *Raw* in the filter select box to get unfiltered data



Perspectives - Arrivals I

gempa

Arrivals Perspective



- Show POIs
  - One simulation is active and affects one or more POIs
  - A manual pick or amplitude is set
- Results from active simulations, manually confirmed picks and amplitudes associated to POI
- Aggregation of multiple selected simulations
- Background color: runup with SSH color gradient
- Text color: active simulation
- Filter data

Perspectives - Arrivals II

gempa

- **Common Data**
  - POI name, Network, Location, Distance, Country, Place, Type, Description
- **Observed Data**
  - Observed tsunami arrival (OTA)
  - Time of observed tsunami maximum wave height (OTM)
  - Observed tsunami maximum wave height (OMSSH)
  - Observed tsunami period (OTP)
- **Simulated Data**
  - T1 Time: Time of arrival of the **minimum** detectable positive amplitude wave
  - T2 Time: Time of **first exceedance** of the threat threshold
  - T3 Time: Time of arrival of **maximum** positive amplitude wave
  - T4 Time: Time when the **last exceedance** of the threat threshold is forecast
  - T1 Value - T4 Value: The wave heights associated with the corresponding times
- **Runup**
  - Corresponds to OMSSH if set, otherwise the T3 Value is used. Regarding the definition of Runup, please consult the respective slides in *Tectonics, Earthquakes, Tsunami and Modeling*.

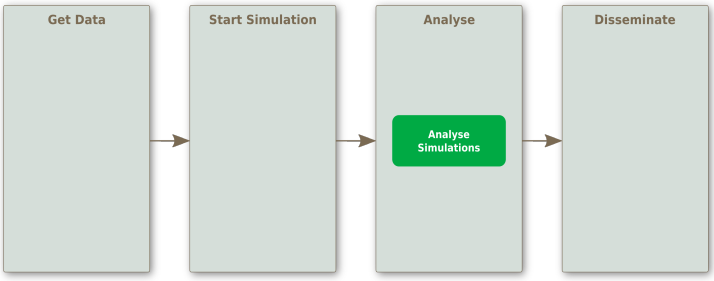
Perspectives - Arrivals III

Arrival Waveform Browser

- Open in Arrivals Perspective
- Compare real time data with simulated data for each well configured POI
- Picking of OTA (Observed tsunami arrival) and OTMA (Observed tsunami maximum amplitude)
  - OTMA determines OTM, OMSSH, OTP for POI
  - Observed data has influence on the residual of the simulation

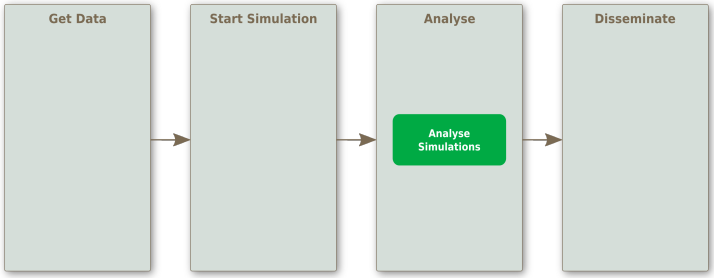
Exercise - Arrivals

1. Select the created simulation in the *Simulation View*
2. In *Map Layers Widget*
   - Disable *POIs > Cluster*
   - Enable *POIs > Names*
3. Press *CTRL + F* to open station search dialog
4. Type in *SIBO*, press *Find* and close dialog
5. Select tide gauge station *SIBO* on map
6. Open *Arrivals Perspective*

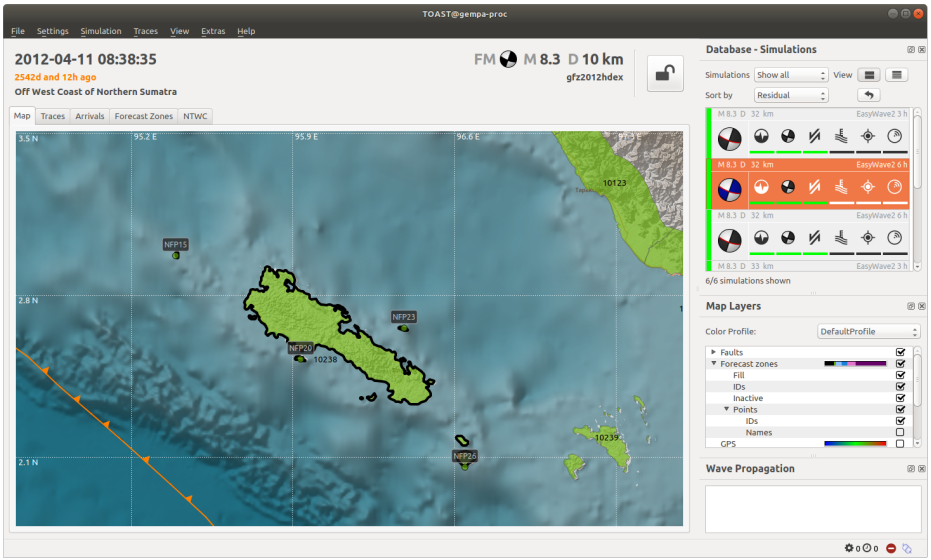


Exercise - Picking

1. Click *Show waveforms* in *Arrivals Perspective* to open the waveform browser
2. Press button 'P' to start picking OTA
3. Pick OTA on waveform
4. Press button 'A' to start picking OTMA
5. Span the area by pressing the mouse on the lowest and releasing it on the highest point
6. Press the *Commit* button
7. Switch back to *Arrivals Perspective*

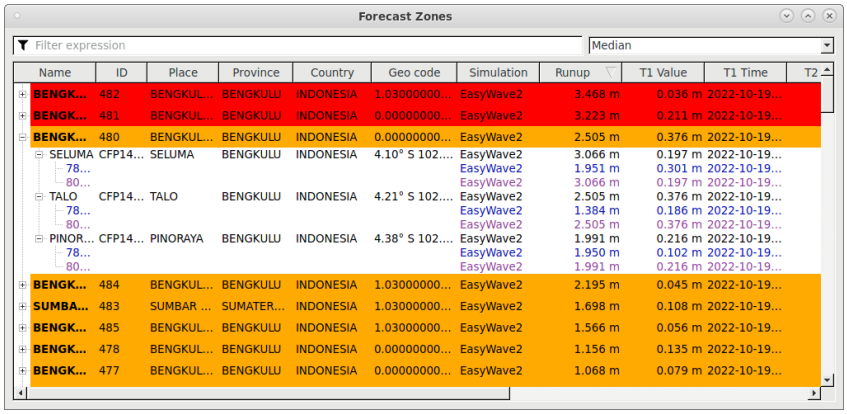


Perspectives - Forecast Zones I



Forecast zone with ID 10238 and the corresponding forecast points in Map Perspective

Perspectives - Forecast Zones II



Forecast zone with ID 10238 in Forecast Zones Perspective

- Shows all affected forecast zones and the corresponding forecast points
- Background color: runup with forecast zones color gradient
- Filter items
- Export

Perspectives - Forecast Zones III

- **Common Data**
  - Name, Ex Box ID, Place, Province, Country, Geo code, Categories
- **Simulated Data**
  - T1 Time: Time of arrival of the **minimum** detectable positive amplitude wave
  - T2 Time: Time of **first exceedance** of the threat threshold
  - T3 Time: Time of arrival of **maximum** positive amplitude wave
  - T4 Time: Time when the **last exceedance** of the threat threshold is forecast
  - T1 Value - T4 Value: The wave heights associated with the corresponding times

Perspectives - Forecast Zones IV

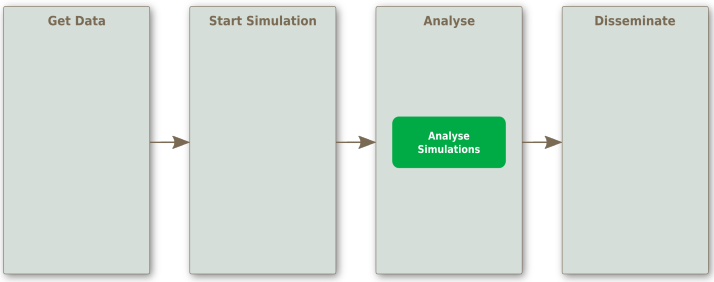
- **Runup**
  - Either it is set manually or otherwise it is derived by aggregating over simulated T3 values.
  - To set it manually, right-click on a forecast zone and then: Runup > Set manually... A manually set Runup is indicated with a person icon to the left.
  - The aggregation works in the following way: The simulated T3 values for all forecast points and all active simulations are evaluated according to the selected runup percentile in the upper right drop-down menu. If no runup percentile is configured, the default is Median, but others like Maximum or 95th percentile can be added using scconfig at `runupPercentiles`.
  - Regarding the definition and estimation of Runup, please consult the respective slides in *Tectonics, Earthquakes, Tsunami and Modeling*.

Perspectives - Forecast Zones V

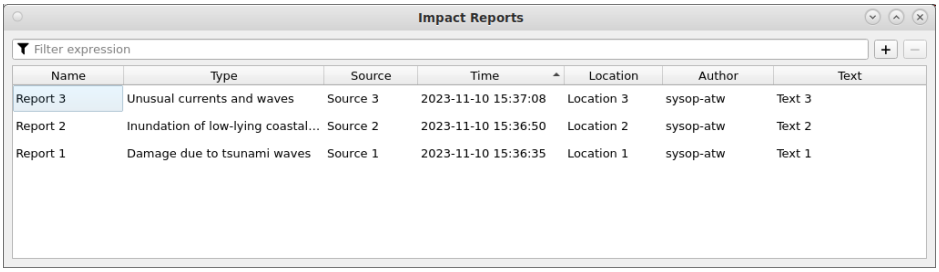
- **Threat Level**
  - Either it is set manually or otherwise it is computed using the configured `threatLevel` profiles.
  - To set it manually, right-click on a forecast zone and then: Threat level > Set manually... A manually set Threat Level is indicated with a person icon to the left.
  - Profiles for Threat Level computation are configured at the TOAST client. They can be added using scconfig at `threatLevel`.
  - They use mathematical expressions based on variables like Runup, Arrival time, Magnitude or Severity. Please consult the documentation or the *Threat Levels* presentation.

Exercise - Forecast Zones

1. Select the created simulation in the *Simulation View*
2. Select in Map Layer Widget:
   - *Forecast zones* > *Points*
   - *Forecast zones* > *Points* > *IDs*
3. Click on colored forecast zone on map
4. Open *Forecast Zone Perspective*
5. Explore forecast points results for selected zone

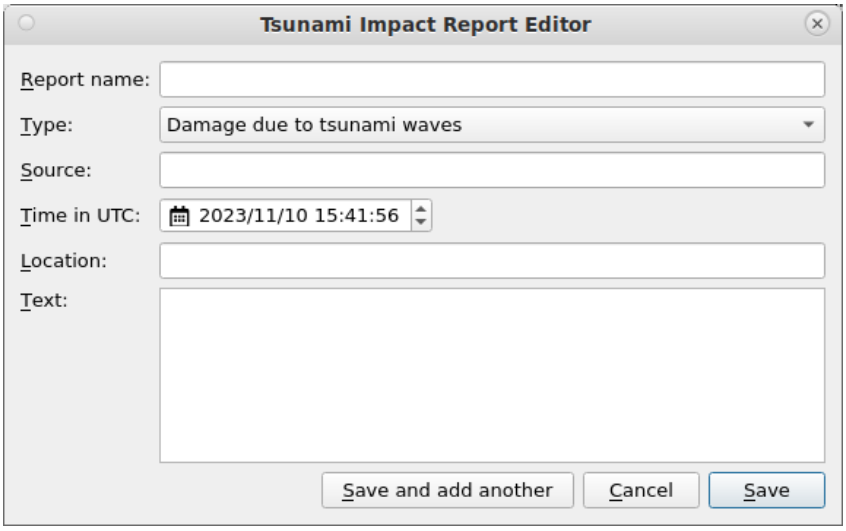


Perspectives - Impact Reports I



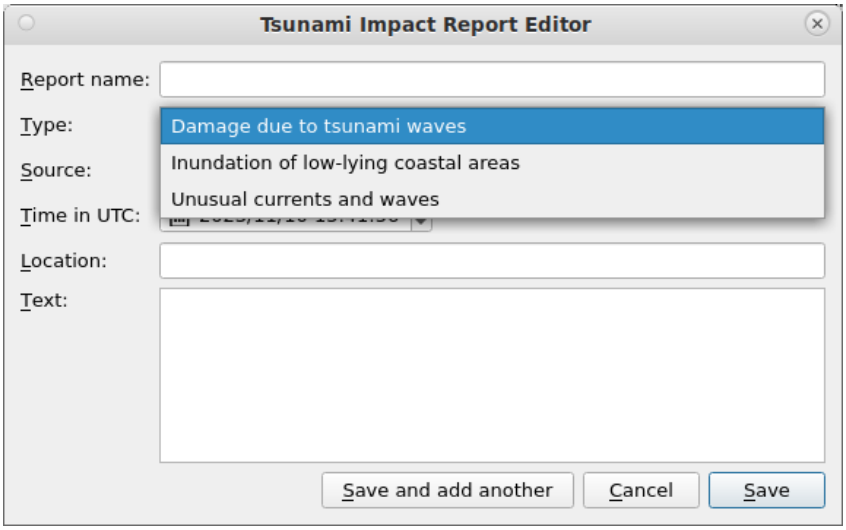
- Impact reports can be added by the user: Click on the '+' icon
- They are stored in the TOAST database together with the incident
- They can be displayed in a bulletin
- To iterate over in a template use clearsilver: `<?cs each:report = ImpactReports ?>`
- Access the fields with: `<?cs var:report.Location ?>`

Perspectives - Impact Reports II



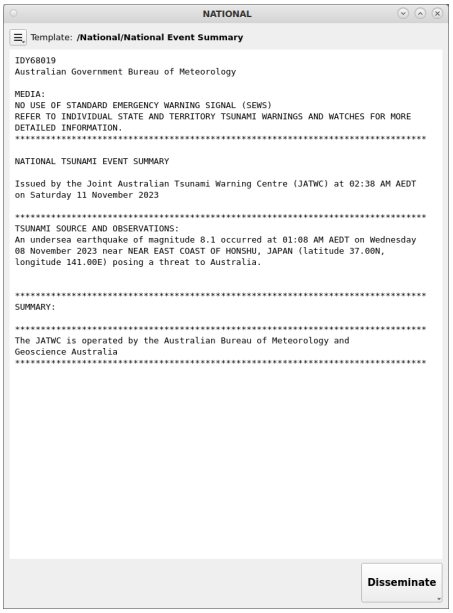
- Click on the '+' icon in the impact reports tab to open the tsunami impact report editor
- Enter the report and Save

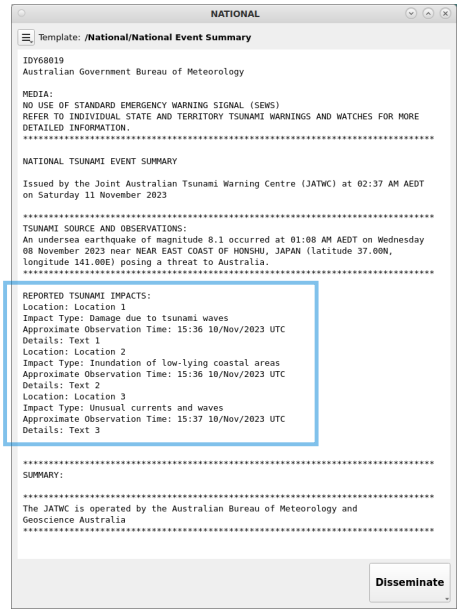
Perspectives - Impact Reports III



- There are 3 default report types
- Additional types can be added by configuration of the TOAST client

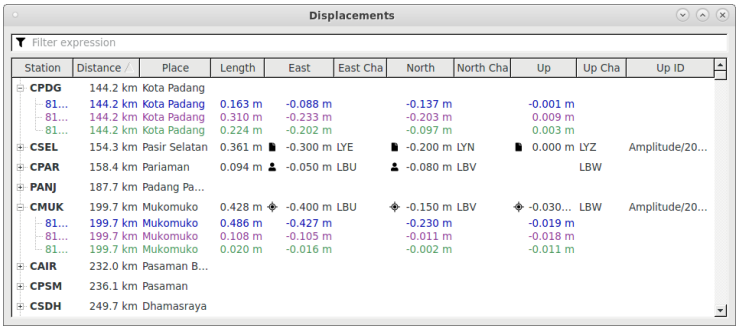
Perspectives - Impact Reports IV





Perspectives - Displacements

Displacements Perspective



For more information on how to use GNSS displacements in TOAST, see the presentation: *Tsunami Early Warning using GNSS*

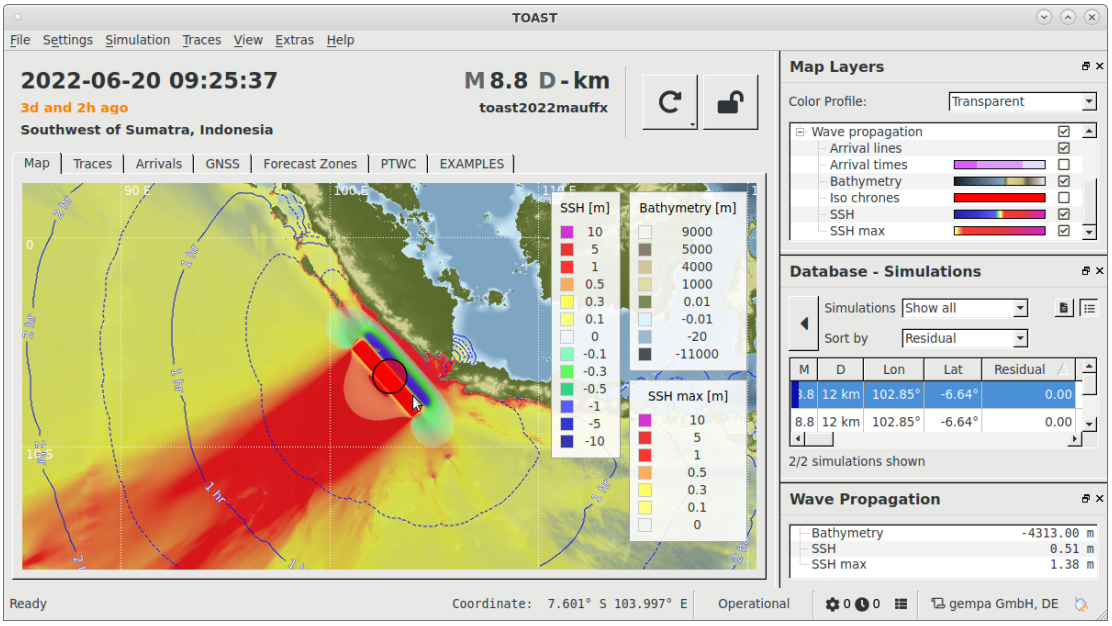
- Show coseismic displacement values at GNSS stations
- Colored values correspond to selected simulations
- Black values are observations
- Icons to the left of observations indicate:
  - Person: Manually entered
  - GNSS symbol: Received automatically via messaging
  - Sheet: Imported from XML file

Perspectives - Live Tabs I

- Overview of information for the dissemination
- Dissemination of bulletins
- Test mode for evaluation purposes

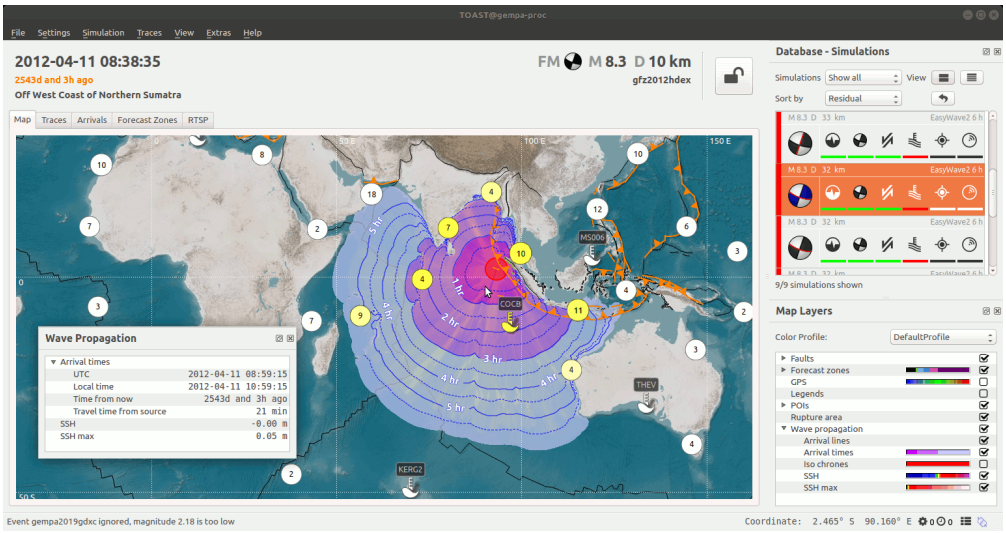
Example Live Tab

Wave Propagation



Wave Propagation

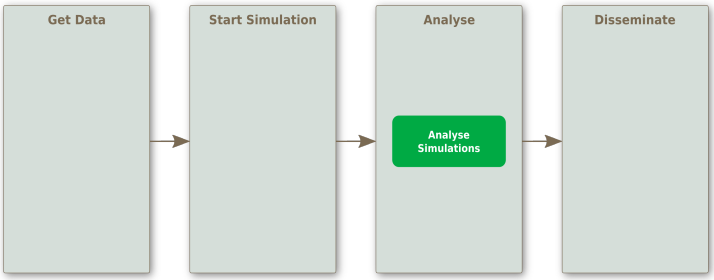
- Show values for current mouse position for activated wave propagation layers
- Data available for Arrival times, SSH, SSH max



Wave Propagation for Arrival times, SSH and SSH max layer

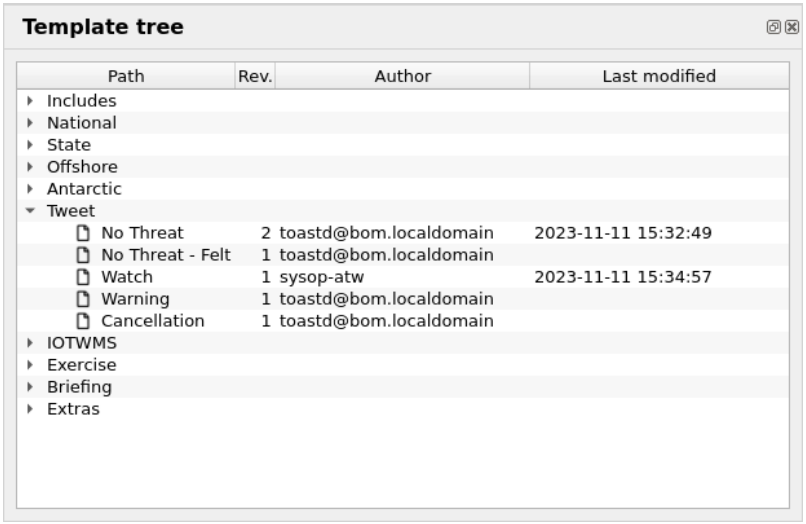
Exercise - Wave Propagation Data

1. Select simulation in *Simulation View*
2. Enable in *Map Layers Widget*
   - *Wave propagation > Arrival times*
   - *Wave propagation > SSH*
   - *Wave propagation > SSH max*
3. Move with mouse over the data grids in map



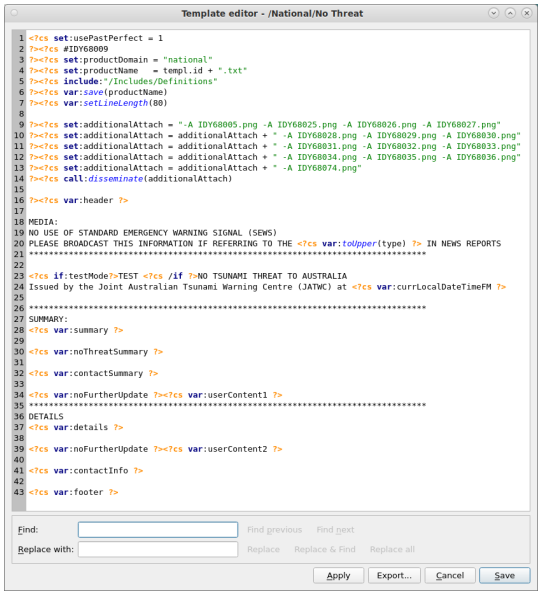
Template Tree I

- The template tree widget shows the template hierarchy of the current incident
- A template can be edited vie double-click or right-click context menu
- The column *Rev.* shows the current revision
- The revision is increased by 1 on each dissemination
- Changes are logged with the client user as author

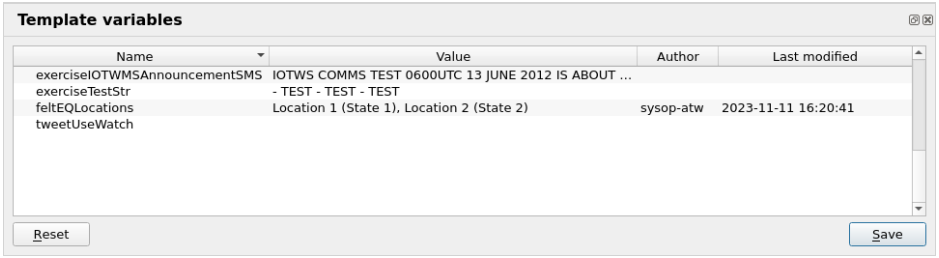


Template Tree II

- The template editor saves changes to the TOAST database
- Templates can also be exported as text file
- *Apply* renders the edited bulletin in the live tab, but does not store it in the database



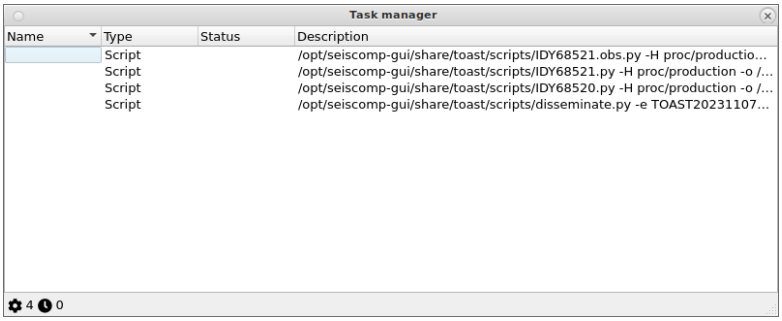
Template Variables



- In the template variables widget, the value can be set with a double-click in row *Value* or right-click contextmenu.
- The template variables are stored in the TOAST database together with the incident
- They can be displayed in a bulletin
- Access the variables with: `<?cs var:incidentVar.feltEQLocations ?>`
- The variables are configured at the TOAST server

Task Manager

- Shows started and pending processes
- Open via menu *Extras* > *Task manager...* or by clicking the task manager icon in the status bar



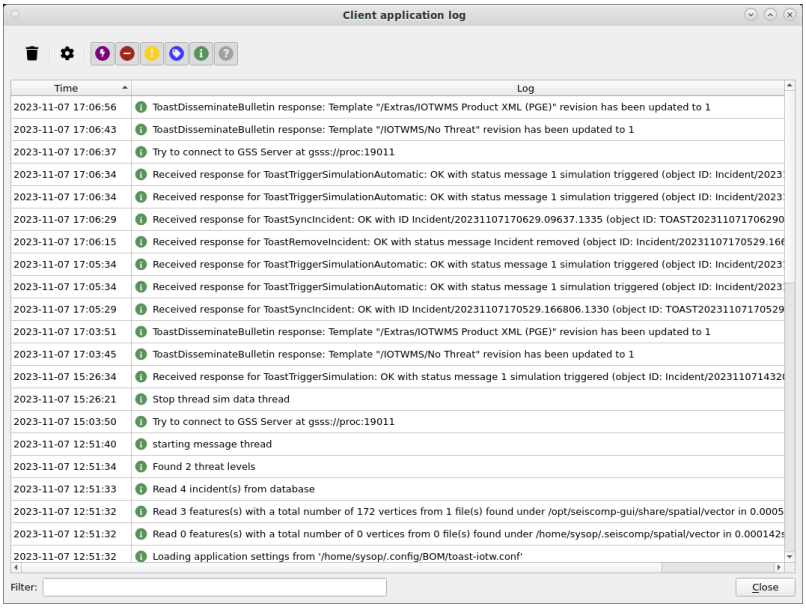
Task manager with pending bulletin processes

Logging

- There are 3 types of logs accessible from the TOAST client:
  - Application log
  - Global log
  - Incident log (filtered view of global log)
- An other useful logging resource is the GDS web interface
  - Shows more information about the dissemination process
  - Can be accessed by clicking the status url in the incident log
- Generally, each SeisComP application logs application output to a file
  - By default, these files are located at `/.seiscomp/log`
  - These files are important for the system administrator
  - and may not be accessible for the TOAST client end user

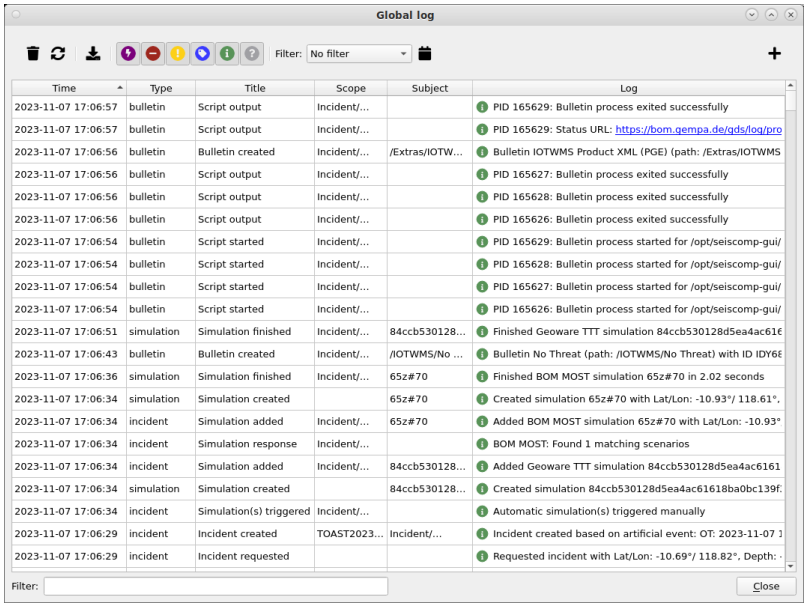
Application Log

- Shows logged information from the TOAST client on application level
- Open via menu *Extras* > *Client application log...* or by clicking the application log icon in the status bar



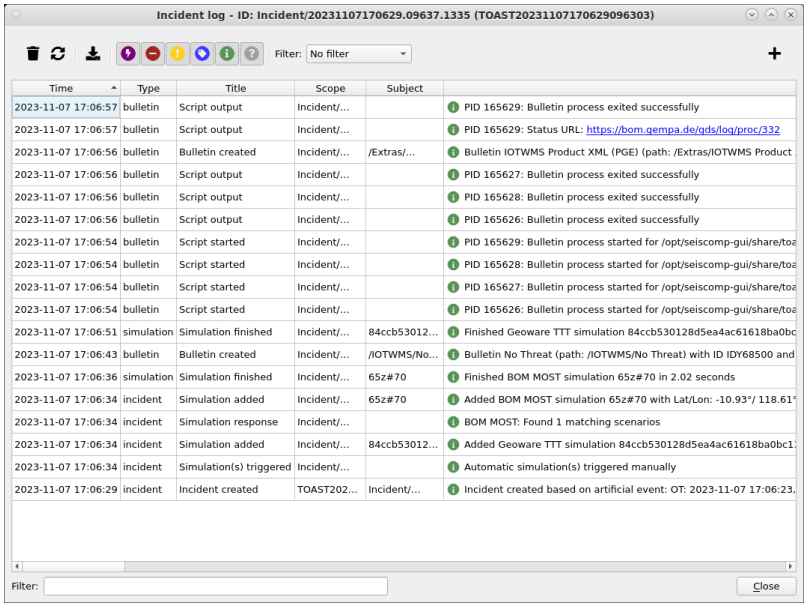
Global Log

- Shows logged information for all incidents and their creation
- Open via menu *Extras* > *Global log...* or by clicking the global log icon in the status bar



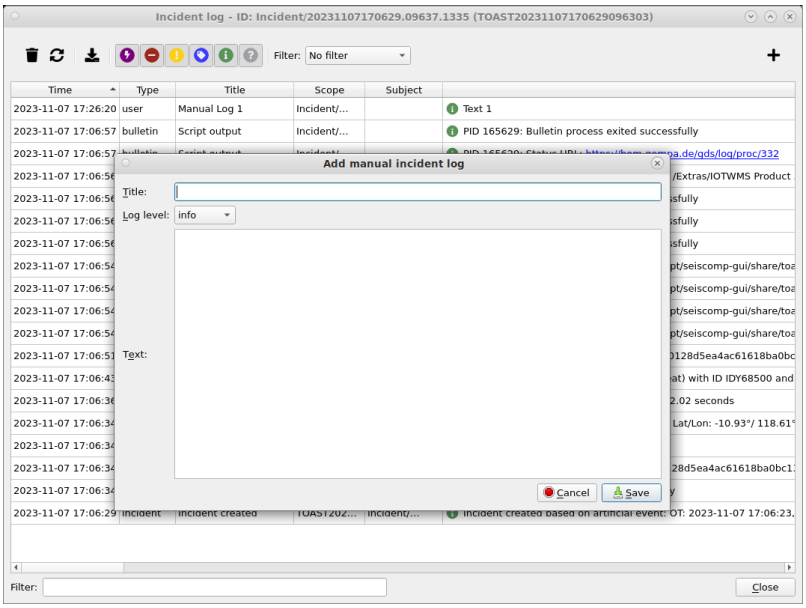
Incident Log

- Shows logged information related to a specific incident
- Open via menu *Extras* > *Incident log...* or by clicking the incident log icon in the Database widget
- Technically a filtered view of the global log



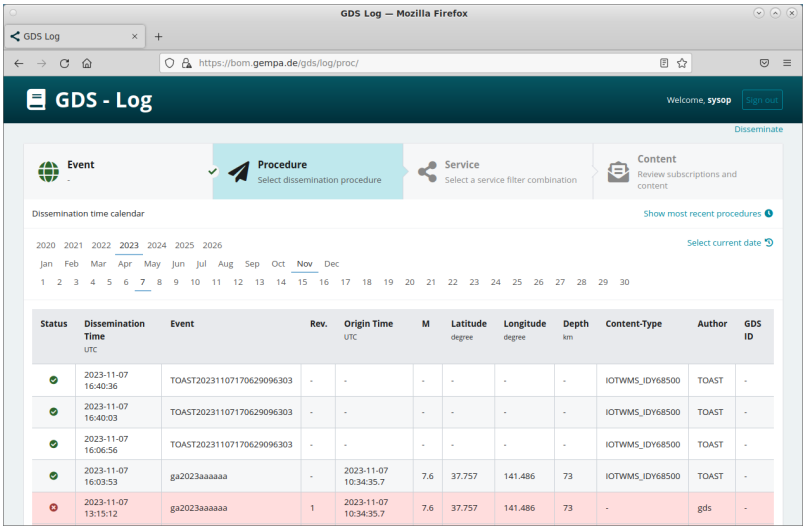
Add Manual Log Entry

- The user can add manual log entries to the global or incident log
- Click on the '+' symbol in global or incident log
- Logs are added to the TOAST DB but can not be deleted by the user



GDS Log I

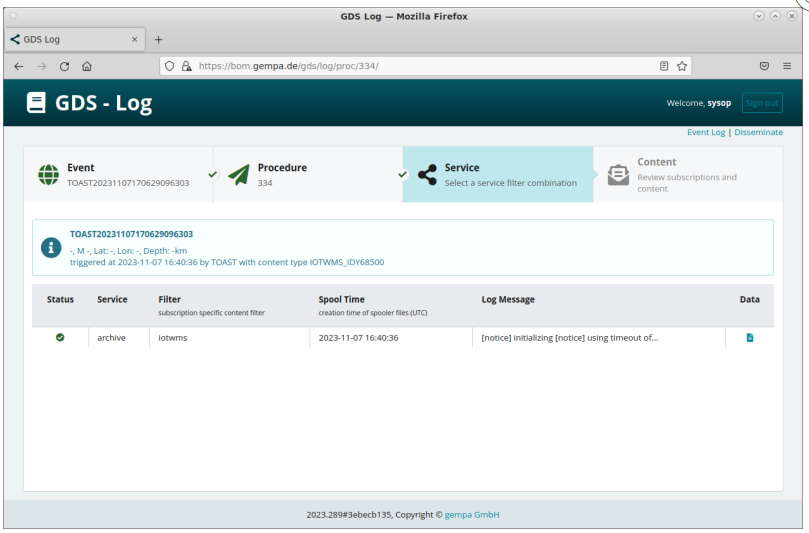
- Procedure



GDS Log II

gempa

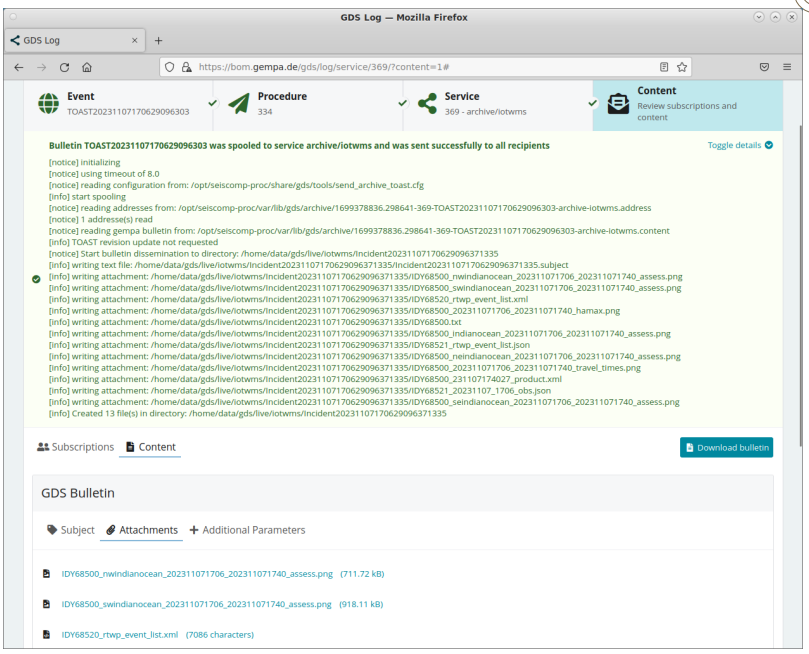
- Service



GDS Log III

gempa

- Content



Triggering of default Simulations I

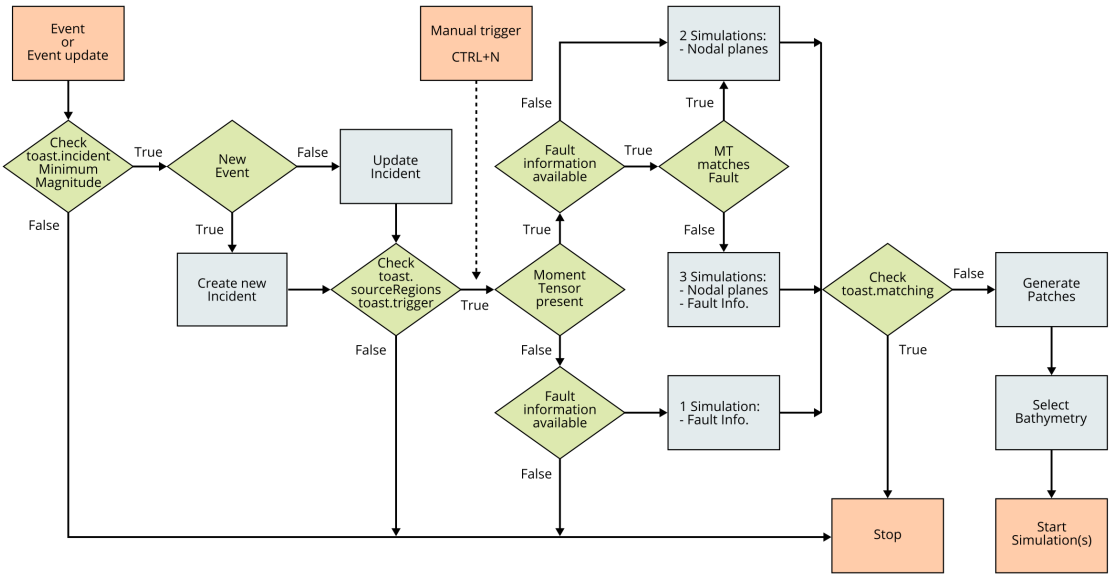
gempa

- The default (automatic) simulations can be triggered in 2 ways:
  - Automatically by events from messaging passing the filters
  - Manually by *Simulation* > *Start* or by Ctrl + N

Triggering of default Simulations II

gempa

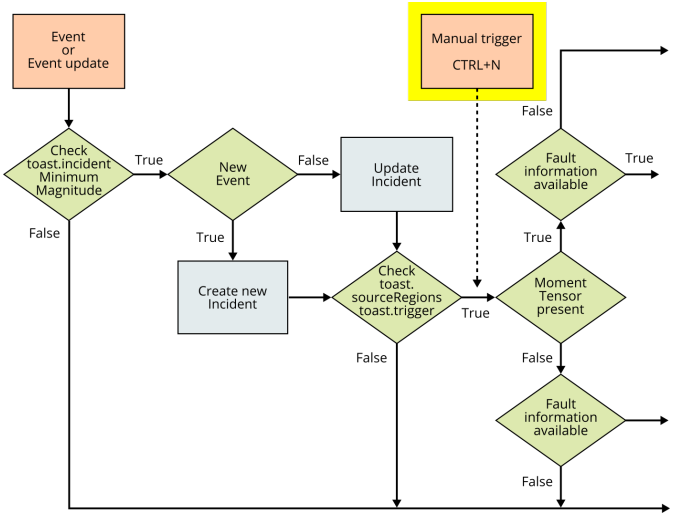
Workflow of default (automatic) simulations



Triggering of default Simulations III

gempa

- Manually trigger default simulation(s) with Ctrl + N or via menu *Simulation > Start*



Automatic Simulations I

gempa

- Start through earthquake updates passing the filters or pressing Ctrl + N
- Filters: minimum magnitude, maximum age of origin time and origin mode (manual, automatic, none)

```
# default configuration
trigger.maximumAge = 1800
trigger.minimumMagnitude = 6.0
```

```
trigger.origin.mode = "automatic"
```

- Matching parameters specify the deviation of event parameters that determines when a simulation is to be calculated with the new parameters:

```
# default configuration
matching.magnitude.variance = 0.1
matching.depth.variance = 30.0
matching.location.variance = 0.1
matching.faultPlane.variance = 0.15
```

Automatic Simulations II

Easywave2 simulation: sample the entire rupture plane

- Easywave2 assumes instantaneous rupturing of the entire rupture plane
- Center the rupture plane w.r.t. to the hypocenter
- Alignment of the rupture along strike and dip:
  - *easywave2.patches.strikeAlign*: **along strike**, 0.5 is at hypocenter, > 0.5 is with strike, < 0.5 is against strike
  - *easywave2.patches.dipAlign*: **along dip**, 0.5 is at hypocenter, > 0.5 is downdip, < 0.5 is updip

Example with centering at all corners, mid of edges and the hypocentre

$x_1 = 0, 0, x_2 = 0, 1, x_3 = 1, 0$

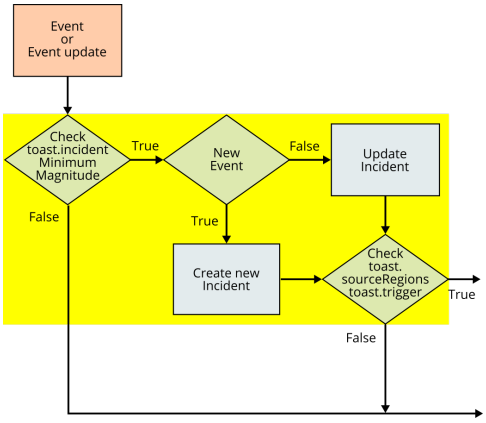
$x_4 = 1, 1, x_5 = 0.5, 0.5$

Configuration in *easywave2.cfg*:

```
easywave2.patches.strikeAlign = 0,0.5,1
easywave2.patches.dipAlign = 0,0.5,1
```

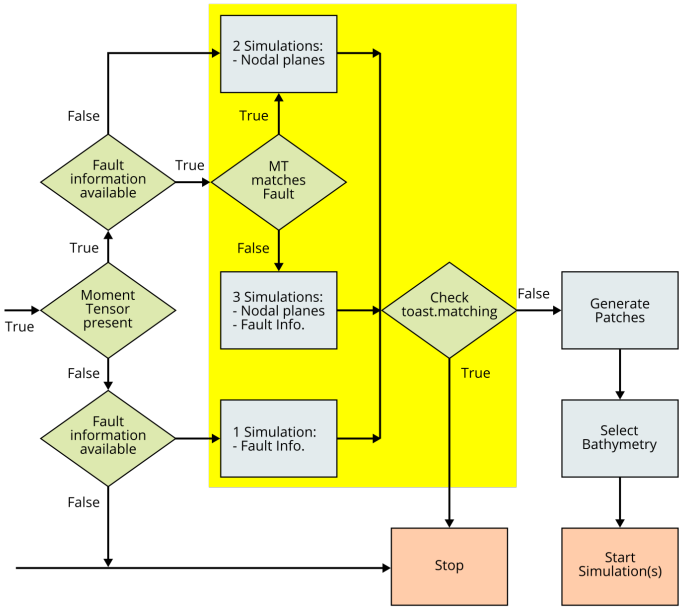
Automatic Simulations III

Define filters and create or update an incident



Automatic Simulations IV

Define matching parameters and automatic creation of 1, 2 or 3 simulations depending on whether a fault or a focal mechanism is available



Manual Simulations - Simulation Setup Dialog I

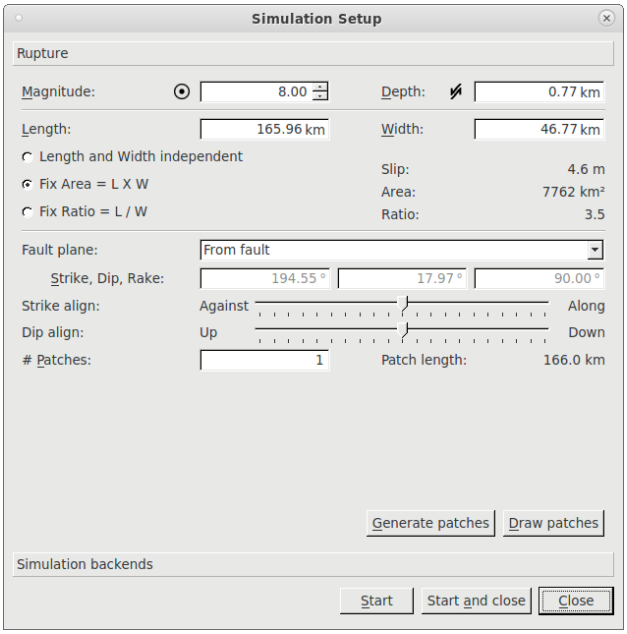
- Interactively start simulation using dialog with Ctrl + Shift ⇧ + N or via menu *Simulation > Start interactive*
  - Provide rupture information and generate patches
  - Provide simulation information and start simulation

Manual Simulations - Simulation Setup Dialog II

gempa

Rupture Tab

- Adjust magnitude and depth (epicenter is from incident)
- Adjust length and width (either independently, or preserving area or ratio)
- **Semi-automatic** patch generation by adapting parameters and *Generate patches* or
- **Interactive** patch generation by *Draw patches*

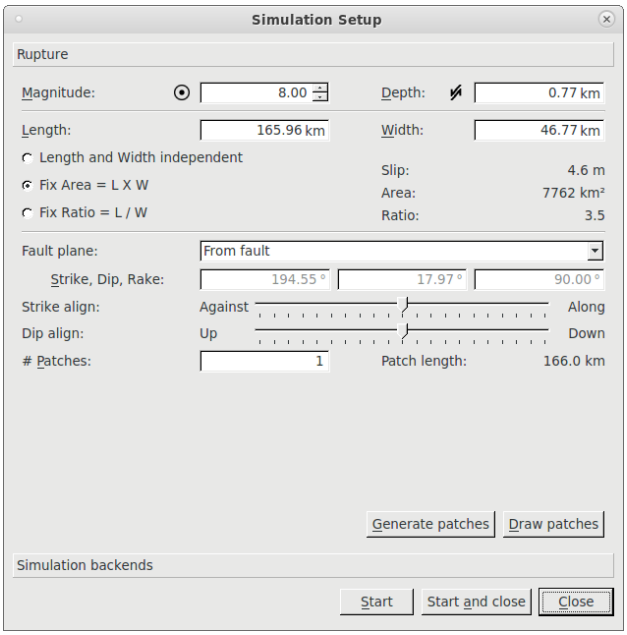


Manual Simulations - Simulation Setup Dialog III

gempa

Semi-automatic Patch Generation

- Select fault plane definition
  - From fault
  - Strike from fault
  - Manual
- Adjust strike, dip and rake accordingly
- Adjust alignment of faults along strike and dip
- Define number of patches to generate
- Click *Generate patches*



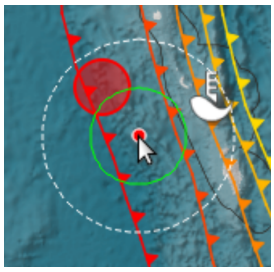
Manual Simulations - Simulation Setup Dialog IV

gempa

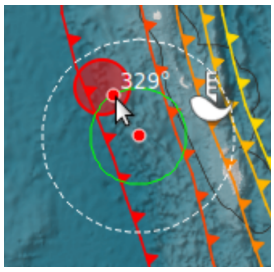
Draw Patches

- Define number of patches
- Click *Draw patches*
- Cursor with 2 circles and a red point in the center is now visible in Map Perspective
  - Red dot - start point of the patch(es)
  - White dashed circle - radius is total patches length
  - Green solid circle - radius is single patch length
- Define start point: left mouse click
- Move red dot on green circle for positioning the end point of the first patch
- Do the same for the remaining patches

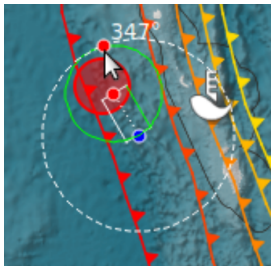
I



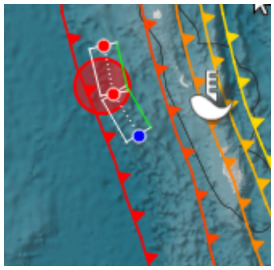
II



III



IV

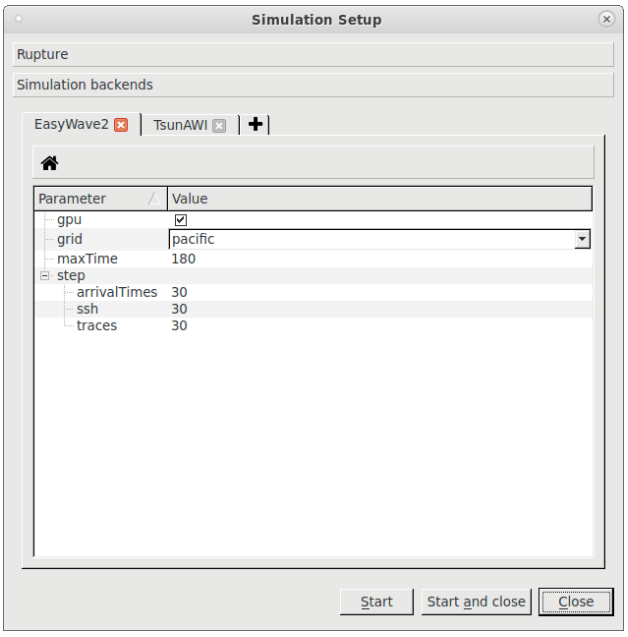


Manual Simulations - Simulation Setup Dialog V

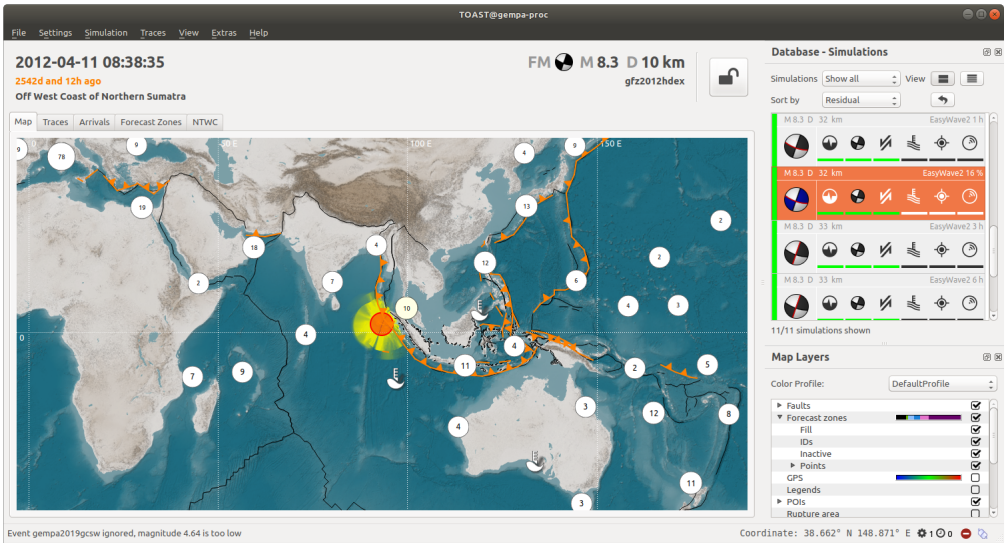
gempa

Simulation backends tab

- Add simulation type by clicking on *plus* button
- Toggle GPU or CPU calculation
- Select bathymetry file (grid)
- Set the duration of the simulation
- Set output interval [min] for the arrival grid
- Set output interval [min] for the SSH grid
- Set output interval [sec] for the traces
- Note: an exclamation mark symbol on the tab means that first you have to generate or draw patches in the Rupture tab!



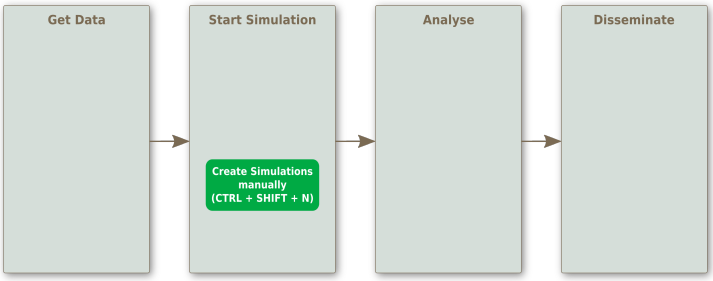
Manual Simulations - Simulation Setup Dialog VI



TOAST with selected simulation in calculation

Exercise - Manual Simulations I

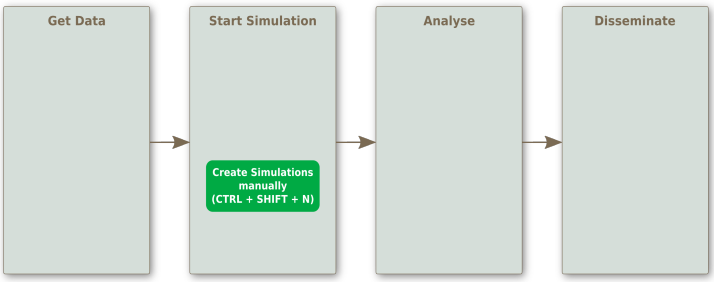
1. Open the Simulation Dialog via menu *Simulation* > *Start interactive*
2. Change magnitude in *General Tab* to 8.0
3. Open *Patches Tab*, press *Draw* and **draw new patches**
4. Change *maxTime* for *EasyWave* in *Simulations Tab* to 240 min
5. Start the simulation



Exercise - Manual Simulations II

gempa

1. Open the Simulation Dialog via menu *Simulation > Start interactive*
2. Change magnitude in *General Tab* to 8.5
3. Press **Generate Patches**
4. Open *Simulations Tab* and change bathymetry file (*grid* option)
5. Change *maxTime* for *EasyWave* in *Simulations Tab* to 180 min
6. Start the simulation

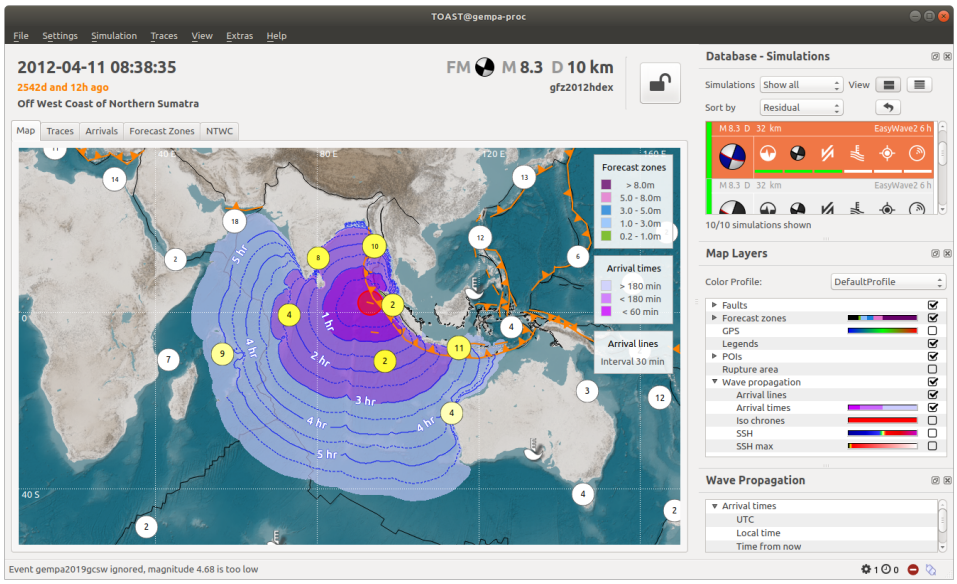


Simulation Results I

gempa

Arrival times and **Arrival lines** layers

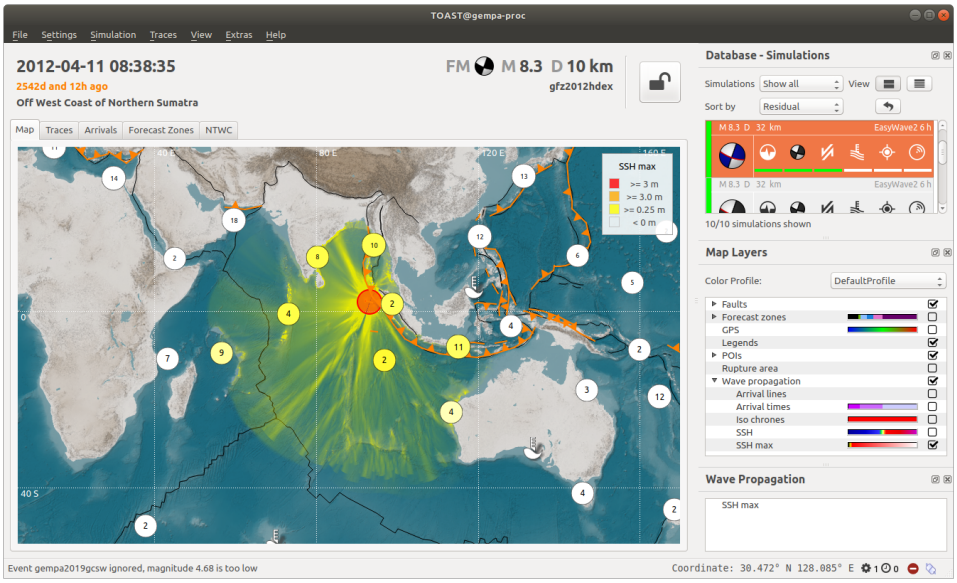
- Extent of the tsunami at certain time steps



Simulation Results II

SSH max layer

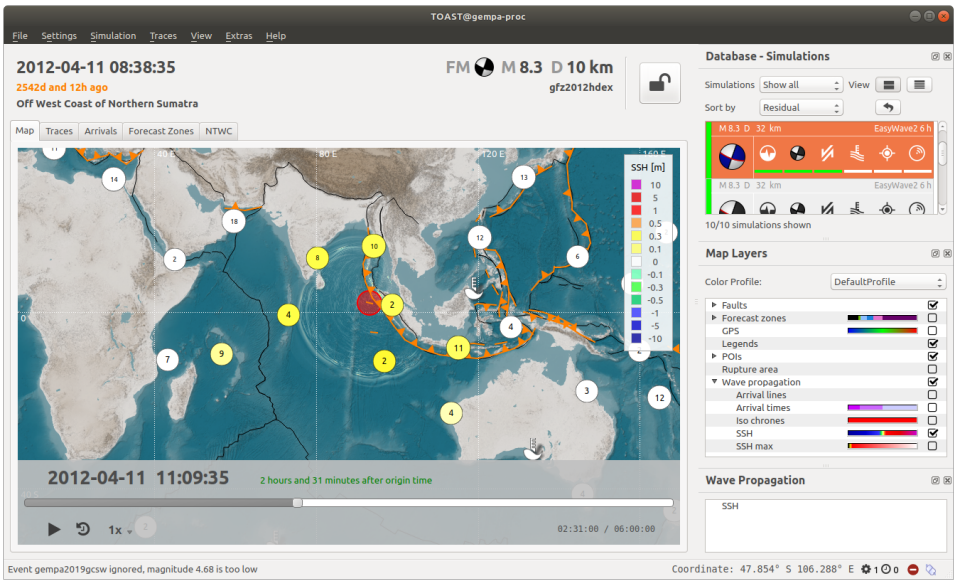
- Maximum Sea Surface Height over time



Simulation Results III

SSH layer

- Sea Surface Height at a certain time

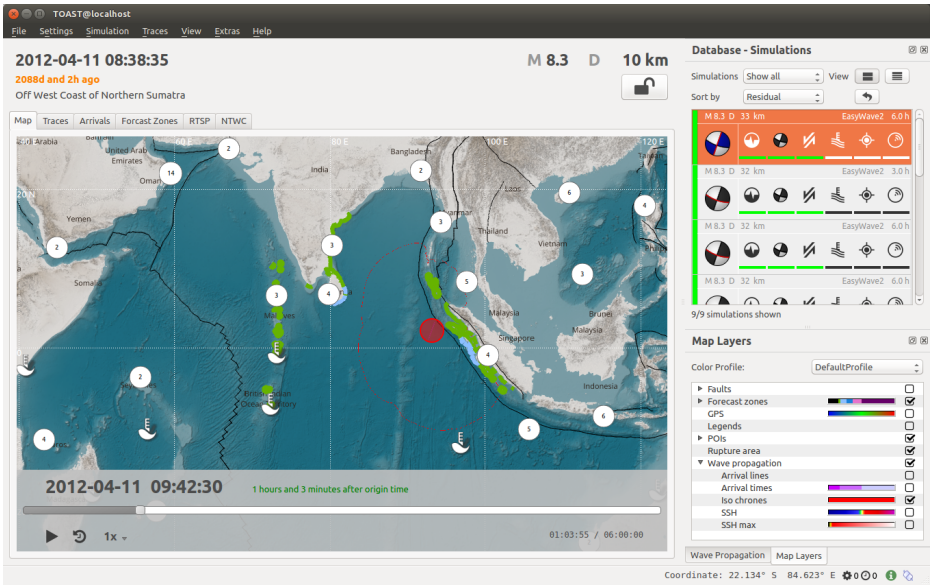


Simulation Results IV

gempa

Isochrones layer

- Maximum extent of the tsunami at a certain time

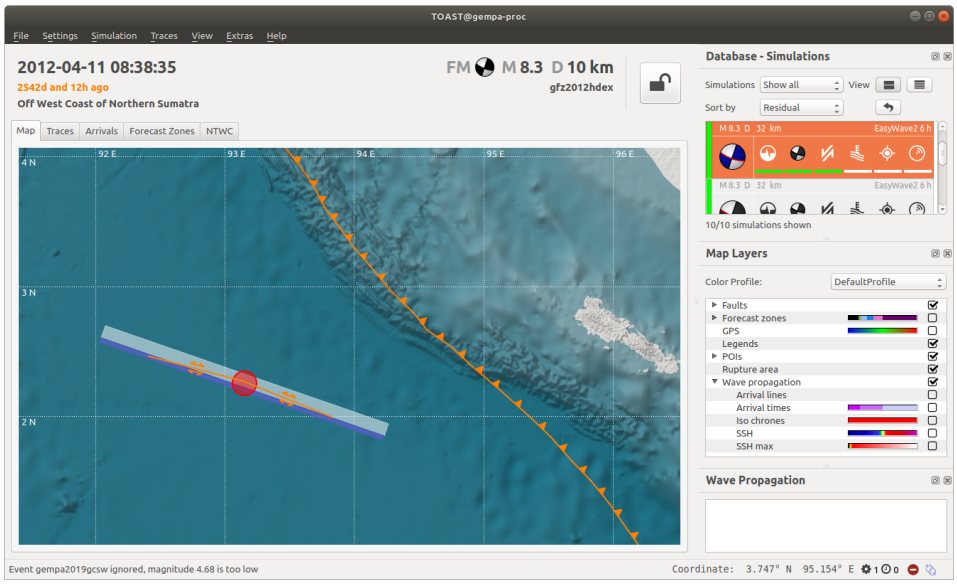


Simulation Results V

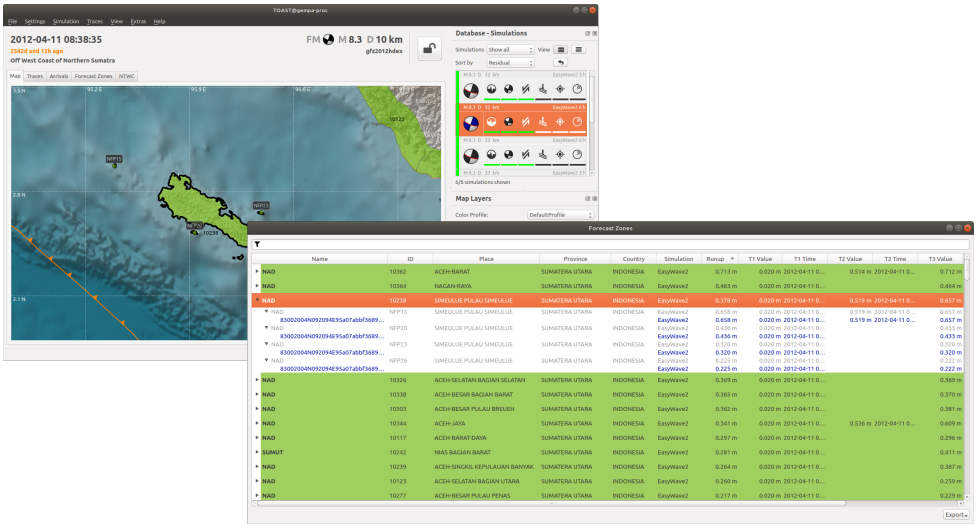
gempa

Rupture layer

- The rupture area used for calculating the simulation

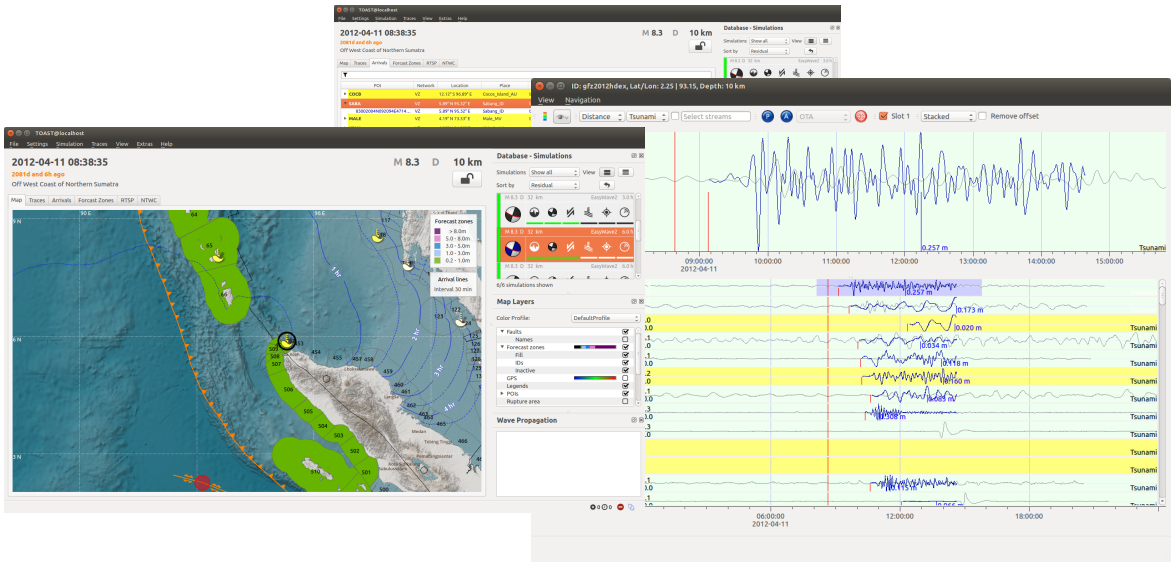


Simulation Results VI



Forecast Zones - Forecast Zones Perspective and Map Perspective

Simulation Results VII



POIs - Map Perspective, Arrivals Perspective and Waveforms

Multiple Selection I

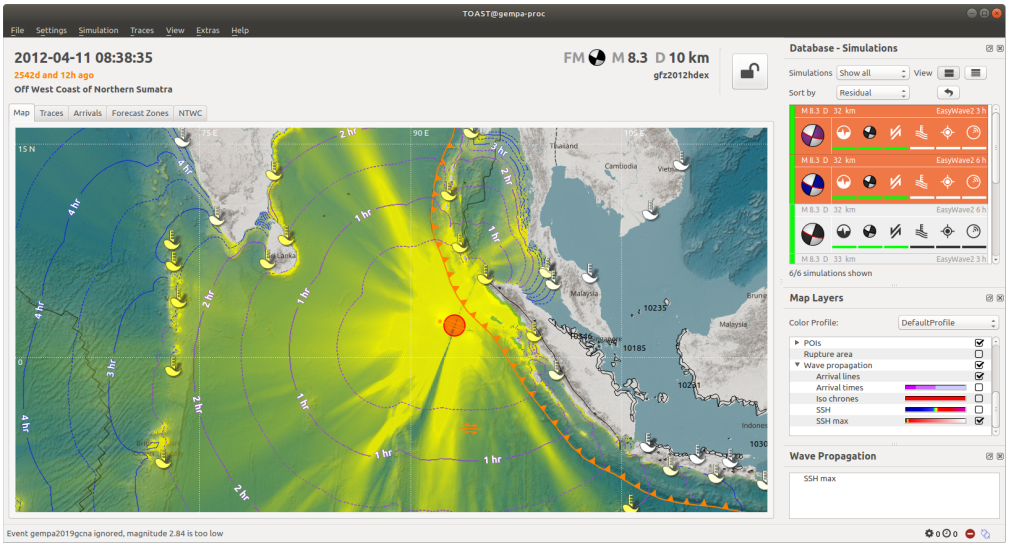
gempa

Multiple selection of simulations in Simulation View

- Each selected simulation has a unique color assigned to it
- Compare different simulations:
  - Layers in Map Perspective
    - Arrival lines and Rupture layer show each feature in the selected color
    - Arrival times, SSH, SSH max and Isochrones layer will be aggregated according to the worst case scenario
  - Forecast points and POIs aggregation
    - T1 - Minimum
    - T2, T3, T4, Runup - Maximum
  - Compare in waveform browser the selected simulations with the real data

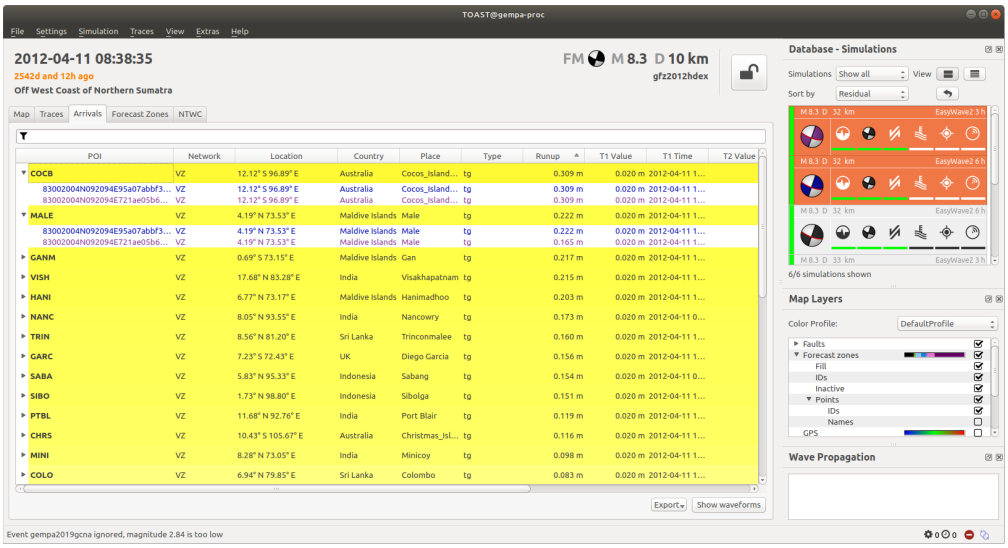
Multiple Selection II

gempa



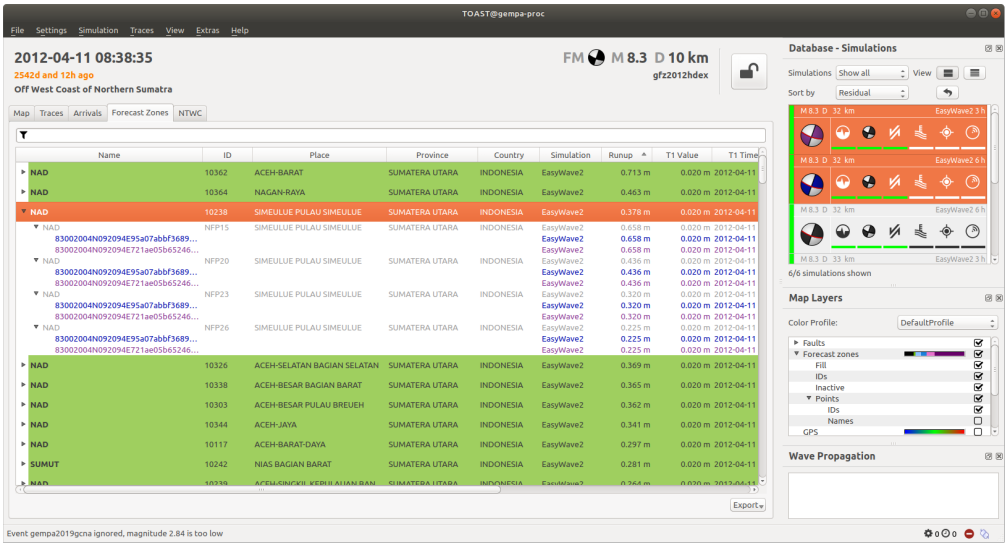
Arrival lines and SSH max layers with multiple selection

Multiple Selection III



Arrivals Perspective with multiple selection

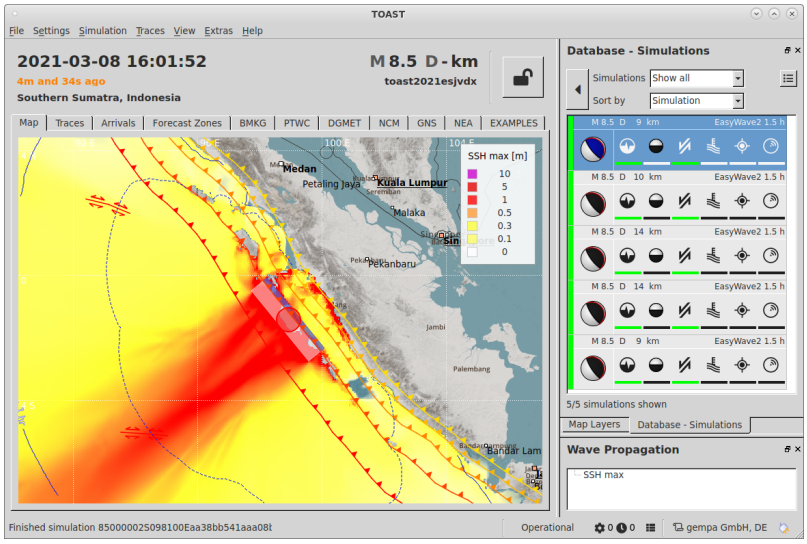
Multiple Selection IV



Forecast Zones Perspective with multiple selection

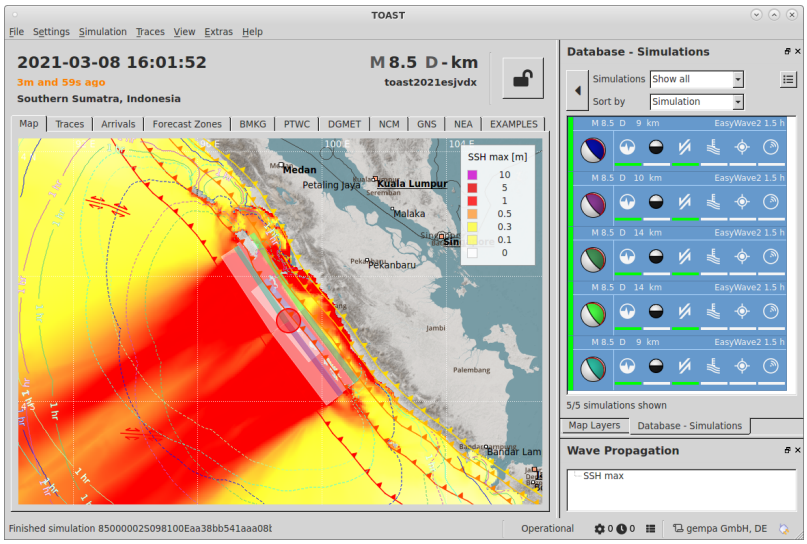
Considering Source Uncertainties in TOAST I

Single simulation selected



Considering Source Uncertainties in TOAST II

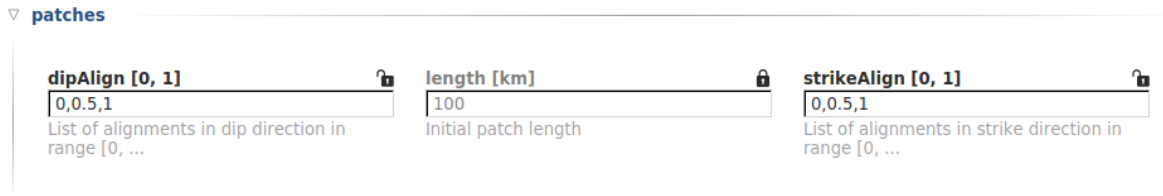
Multiple simulations selected and aggregated



Considering Source Uncertainties in TOAST III

gempa

- If several simulations are set active (CTRL+click or SHIFT+click), TOAST applies a worst-case aggregation
- EasyWave2 can be configured so as to automatically vary fault alignment in order to capture possible unilateral rupture propagation
- Setup EasyWave2 patches for multiple automatic simulations using scconfig:

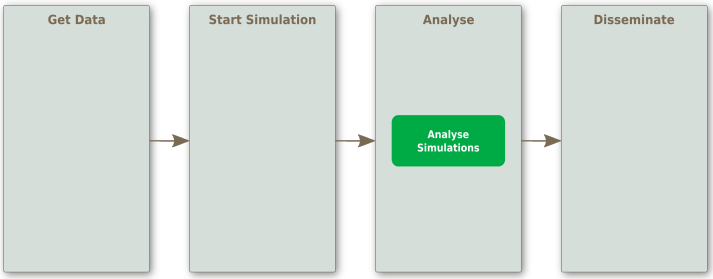


- `dipAlign` shifts the fault up and down, `strikeAlign` shifts the fault against and along strike (trench)
- Here, *0.5* aligns the fault around the epicenter, while *0* and *1* shift the fault by half fault length toward the start and the end of the rupture

Exercise - Multiple Selection I

gempa

1. Select the artificial incident from the first exercise by double click in *Incident View*
2. Sort by *Creation Time*
3. Select first simulation
4. Press CTRL and double click on the last simulation to select it
5. In *Map Layers Widget*
   - activate *Wave propagation > Arrival lines*,
   - activate *Wave propagation > SSH max* and
   - deactivate all the other *Wave propagation* items

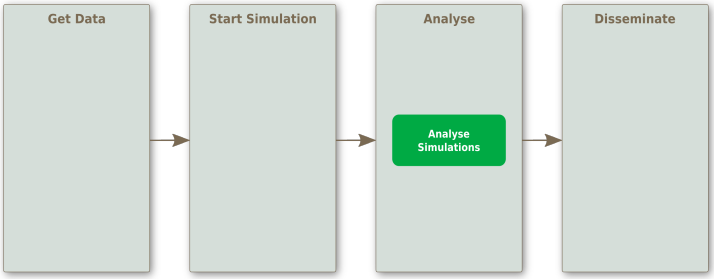


Exercise - Multiple Selection II

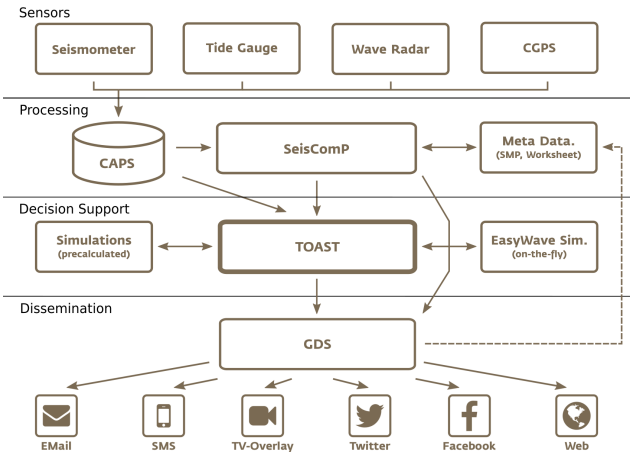
6 Inspect *Map Perspective*

7 Select station *SIBO* again, open *Arrivals Perspective* as well as the waveforms

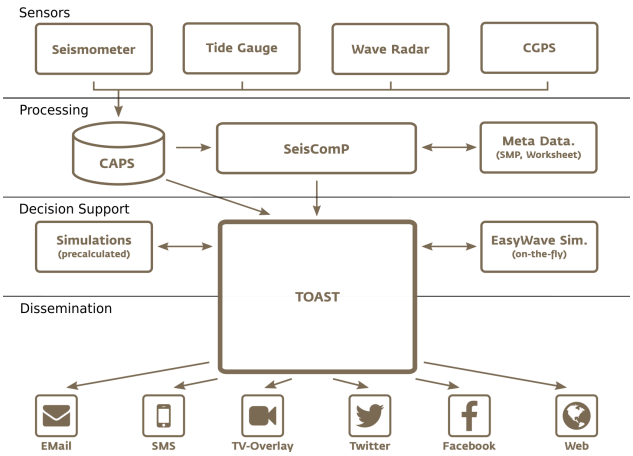
8 Switch to *Forecast Zones Perspective* and expand multiple forecast zone and forecast point items



TOAST Dissemination I

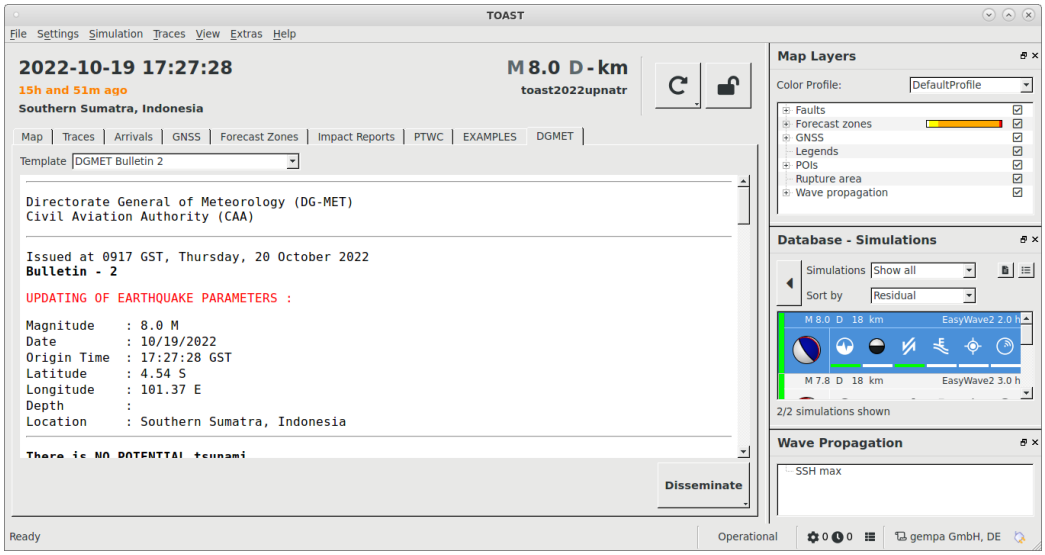


Dissemination with GDS



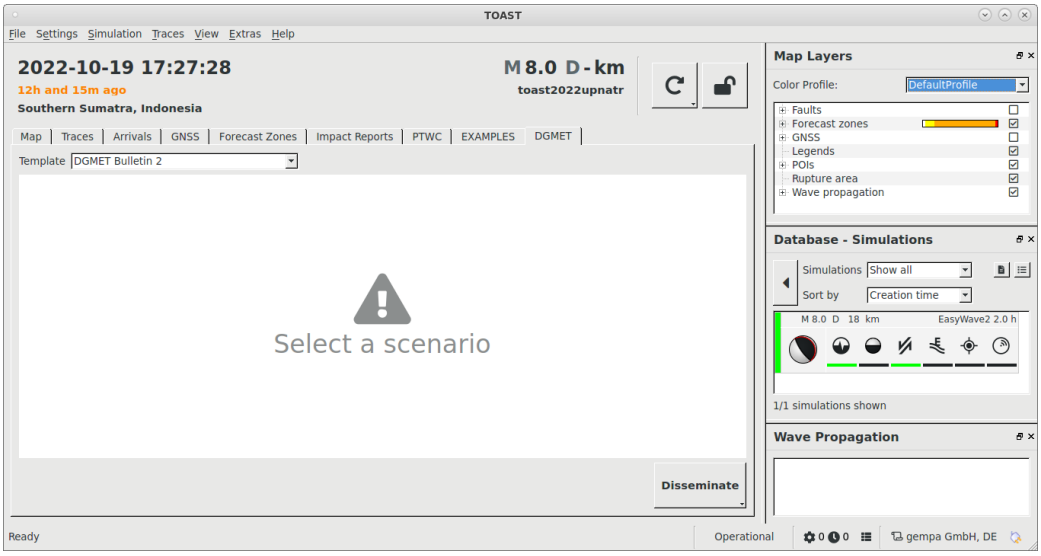
Dissemination with TOAST

TOAST Dissemination II



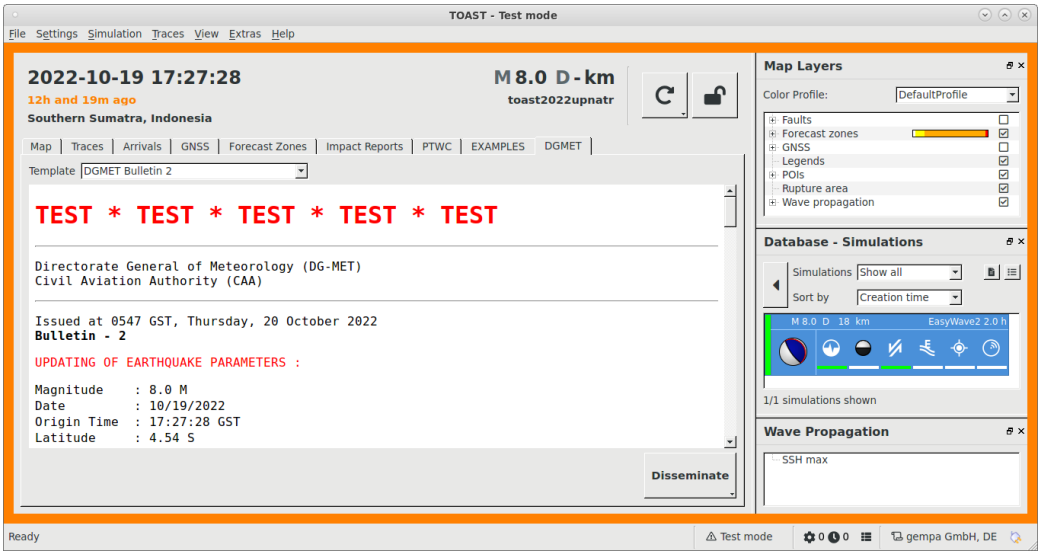
Example Live tab

TOAST Dissemination III



Example Live Tab with no selected simulations

TOAST Dissemination IV



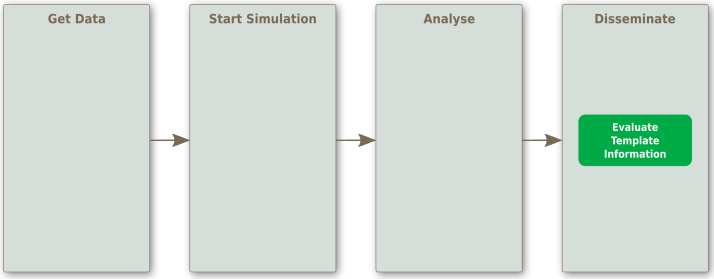
Example Live Tab in test mode

Exercise - Dissemination I

1. Select the artificial incident from the first exercise by double click in *Incident View*
2. Select a simulation
3. Open the on your system configured *Live Tab*
4. Press the *Disseminate* button
5. Open a terminal and type

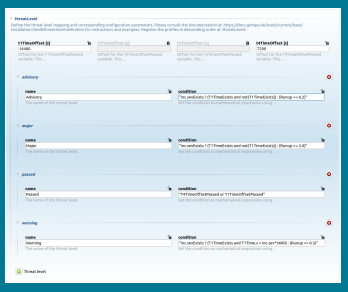
```
-cd /tmp/toast/
-ll
-
```

to see text file and images created by TOAST bulletin



4.8 TOAST - Threat Levels

TOAST - Threat Level Mapping



Dr. Andreas Hoechner and TOAST team

gempa GmbH, Potsdam, Germany

Outline

Motivation

gempa

- Threat level mapping has been introduced in TOAST in 2023.
- Before that, threat level could only be visualized using the forecast zones color gradient which uses runup as key.
- In templates, a clearsilver definition had to be used.
- *Threat level* is a property of the forecast zones.
- It is typically assigned based on runup value of the active simulation.
- However, more complex mappings are possible including travel times for non-seismic events and clearing threat.

Documentation

gempa

- The online documentation for TOAST can be found at:
  `https://docs.gempa.de/toast/current/`
- **Note that the online documentation is not yet adapted to the TOAST multiuser configuration!**
- The up-to-date documentation is located within the VM (as well as on the test system):
  `file:///home/tews/seiscomp-gui/share/doc/toast/html/index.html`
- More specifically:
  - Threat level mapping configuration
    `file:///home/tews/seiscomp-gui/share/doc/toast/html/base/installation.html#threat-level-mapping-configuration`
  - Threat level configuration options
    `file:///home/tews/seiscomp-gui/share/doc/toast/html/apps/toast.html#confval-threatLevel.-name.condition`

Configuration - Threat Levels I

gempa

- The threat levels are configured at the TOAST client:
  `/home/tews/seiscomp-gui/etc/toast.cfg`
- This allows to set-up TOAST clients with different threat levels for different purposes like national or regional warning.
- Threat level mapping is set up by creating threatLevel profiles using scconfig and registering the profiles at *threatLevels*.
- The threat level profiles have to be registered in **descending** order, e.g.:

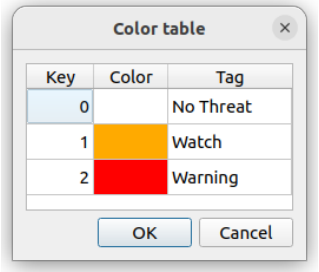
```
threatLevels = threat-warning,threat-watch,threat-none
```

- In this case, they are assigned the numerical levels 2, 1 and 0 by TOAST.
- Use these numerical levels as keys for threat level color gradients.

Configuration - Color Gradient I

gempa

- Use the numerical levels as keys for threat level color gradients.



Configuration - Variables and Conditions I

gempa

- The first profile whose condition is fulfilled determines the threat level.
- The variables which can be used generally correspond to the columns in Forecast Zones perspective without spaces (e.g. *Geo Code* → *GeoCode*)
- Times can be accessed as seconds and milliseconds (e.g. *TITime.s* and *TITime.ms*)
- For every variable there is an additional *[Variable]Exists* variable to check if it is valid, e.g. *RunupExists*.
  - Use *simExists* to verify if a simulation is available.
  - Note that if a variable is not valid, it is still initialized to a default value.
  - This is 0 for numeric variables and an empty string for text variables, e.g. *TITimeExists==False* → *TITime.s=0 and TITime.ms=0*.
- The variables *threatLevel.txTimeOffset* can be used via *TxTimeOffsetPassed* with *x=1..4*.

Configuration - Variables and Conditions II

gempa

- Incident parameters can be accessed in the following way: *inc.mag*, *inc.magType*, *inc.lat*, *inc.lon*, *inc.depth*, *inc.time*, *inc.sourceType*, *inc.sourceTypeComment*, *inc.sourceOrigin*, *inc.evalMode*, *inc.sev*.
- Similarly, simulation parameters can be accessed in the following way: *sim.mag*, *sim.lat*, *sim.lon*, *sim.depth*, *sim.sourceType*, *sim.sourceTypeComment*, *sim.status*, *sim.type*, *sim.maxTime*, *sim.availTime*.
- If several simulations are selected, for each simulation a True/False value is returned and they are combined via logical or, e.g. *Sim1* returns *True* and *Sim2* returns *False*, then the overall value is *True*.
- The mathematical conditions are evaluated using the Mathematical Expression Library *ExprTk* which is described here: https://www.partow.net/programming/exprtk/

Severity Concept

gempa

Here we give a short description of the new **Severity** feature

- *Severity* is an incident property which can be used for non-earthquake events which thus do not have a magnitude.
- It can be set by the user on incident creation or editing.
- It represents a time span in hours.
- The idea is to configure the threat levels in a way that
  - if no magnitude is present, then severity is used
  - and each forecast zone which has TI < severity is assigned a threat,
  - and if TI above severity no threat is assigned.
- It can be accessed in the threat levels via *inc.sev*.

Examples I

gempa

An example for threat level profiles which depend only on runup value looks like this:

```
threatLevel.threat-warning.title = "Warning"
threatLevel.threat-warning.condition = "Runup>=3"
threatLevel.threat-watch.title = "Watch"
threatLevel.threat-watch.condition = "Runup>=0.5"
threatLevel.threat-none.title = "No Threat"
threatLevel.threat-none.condition = "RunupExists"
```

Here is an example for a condition where the threat level additionally depends on forecast zone category:

```
threatLevel.threat-cat.condition = "(Runup>=3 and 'mainland' in Categories)
                                 or (Runup>=2 and 'offshore' in Categories)"
```

Examples II

gempa

If you want to define threat levels which depend on runup if it exists and otherwise on travel time and magnitude, do:

```
threatLevel.mag.condition = "RunupExists ? Runup>=3
                                         : T1TimeExists and T1Time.s>=0 and
                                           T1Time.s<3600 and sim.mag>=7"
```

This example uses only severity as a condition:

```
threatLevel.severity.condition = "T1Time.s/60/60<inc.sev"
```

Combine these example definitions in order to get the desired results.

Example Configuration in Training VM I

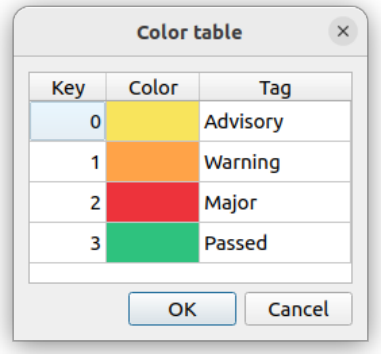
gempa

```
threatLevels = passed, major, warning, advisory

threatLevel.t1TimeOffset = 14400
threatLevel.t4TimeOffset = 7200

threatLevel.passed.name = Passed
threatLevel.passed.condition = "T4TimeOffsetPassed or T1TimeOffsetPassed"

threatLevel.major.name = Major
threatLevel.major.condition = "inc.sevExists ? (T1TimeExists and not(T1TimeExists))
                                             : (Runup >= 3.0)"
threatLevel.warning.name = Warning
threatLevel.warning.condition = "inc.sevExists ? (T1TimeExists and T1Time.s < inc.sev*3600)
                                               : (Runup >= 0.5)"
threatLevel.advisory.name = Advisory
threatLevel.advisory.condition = "inc.sevExists ? (T1TimeExists and not(T1TimeExists))
                                               : (Runup >= 0.2)"
```

Example Configuration in Training VM II

gempa

Color Gradient Editor



~/seiscomp-gui/share/toast/mapstyles.cfg:

```
{"name": "ThreatLevelGradBmkg",
 "discrete": true,
 "stops": [
  {"color": "rgba(248, 228, 92, 255)",
   "value": 0.0,
   "text": "Advisory"},
  {"color": "rgba(255, 163, 72, 255)",
   "value": 1.0,
   "text": "Warning"},
  {"color": "rgba(237, 51, 59, 255)",
   "value": 2.0,
   "text": "Major"},
  {"color": "rgba(46, 194, 126, 255)",
   "value": 3.0,
   "text": "Passed"}]}
```


Exercises:

gempa

1. Modify the runup thresholds in the VM for Major, Warning and Advisory to 2, 1, 0.3 respectively.
2. Remove the threat level Major. Don't forget to remove also the registration and to adapt the gradient.
3. Increase the clearing time after T1 to 6 hours.

4.9 TOAST - GNSS

gempa

Tsunami Early Warning using GNSS

Dr. Andreas Hoechner

gempa GmbH, Potsdam, Germany

June 30, 2023

Outline

gempa

Principles

gempa

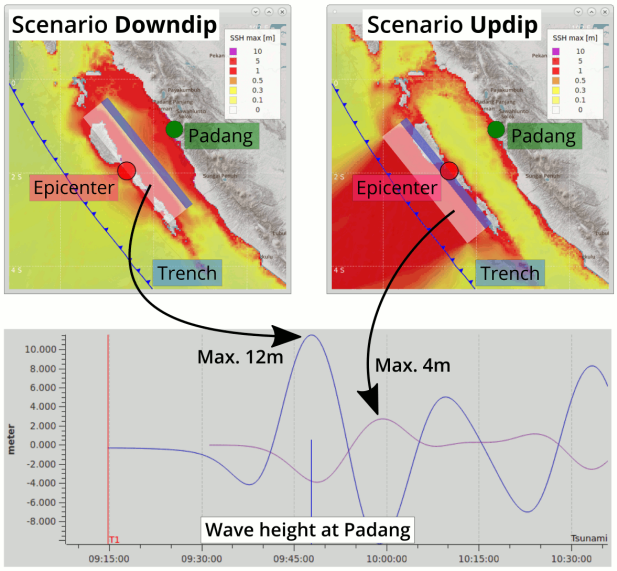
How can GNSS be used for Tsunami Early Warning?

- An earthquake deforms the seafloor and thus causes a tsunami
- The sea floor is hardly observable (especially in real-time)
- The induced deformation also affects near-by land mass
- There the coseismic surface displacements can be measured using high-precision real-time GNSS (precision on the order of a few mm to cm within seconds)
- The displacement (GNSS) 'footprint' is strongly related to the slip distribution at the fault
- Comparing observed and simulated displacement vectors is an additional strong and independent criterium for simulation selection

Example: Scenarios Padang Updip and Downdip I

gempa

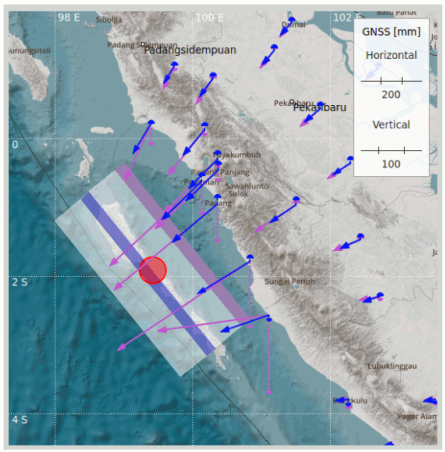
Two earthquakes with same epicenter and magnitude M=8.5 with very different impact



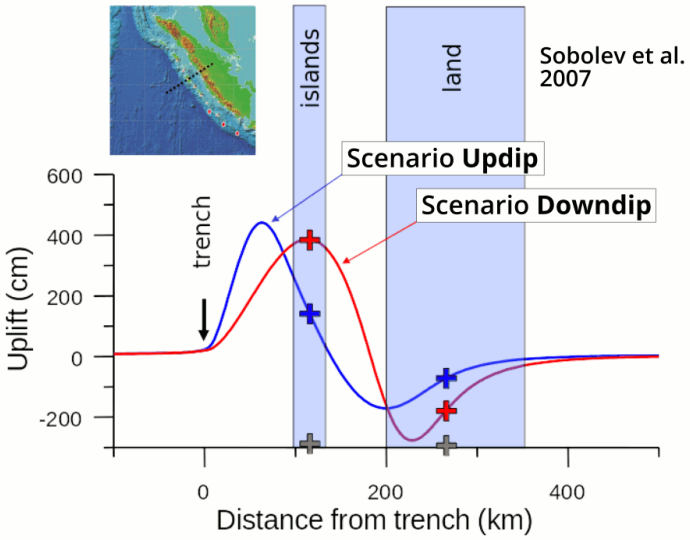
Example: Scenarios Padang Updip and Downdip II

gempa

The two earthquakes cause clearly distinct displacement patterns



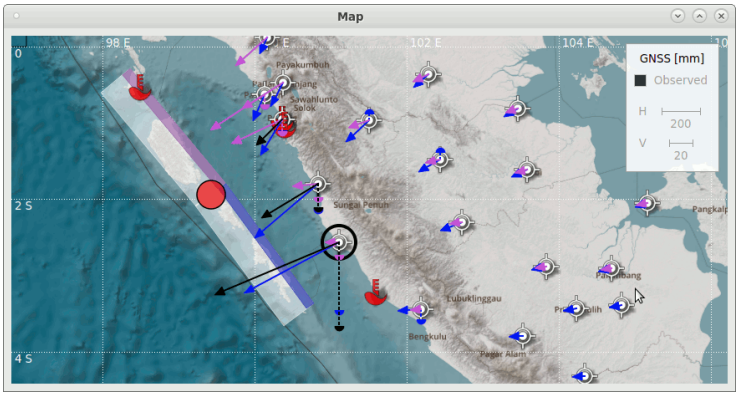
Displacement vectors



Example: Unilateral propagation

gempa

Two earthquakes with same epicenter but opposite propagation direction



- The two scenarios have clearly different displacement (GNSS) fingerprints
- Even from visual inspection the Southern scenario (blue) has much better agreement with the observed displacements (black arrows) than the Northern (magenta)

Excursion: Tohoku 2011 Hindcasting Study I

gempa

GNSS observations can be used to observe rupture propagation in near-real-time

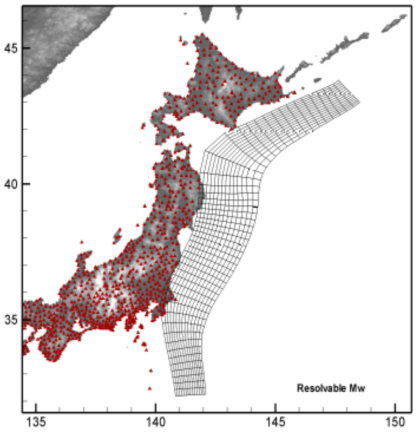
- In this hindcasting study, GNSS observations were used in a quasi-real-time manner for simulating tsunami early warning
- GNSS measurements at various time steps after earthquake start were inverted to reconstruct the slip distribution at the fault (assuming known geometry from subduction interface)
- Having a source model, it is possible to compute the deformation at the sea floor
- The predicted sea floor deformation was used as initial condition for an on-the-fly tsunami simulation

Excursion: Tohoku 2011 Hindcasting Study II

gempa

- GEONET array operated by Geospacial Authority of Japan consisting of more than 1200 online GPS-stations
- 30 sec sampling rate RINEX data
- RUM model of slab interface geometry
- GEBCO08 bathymetry

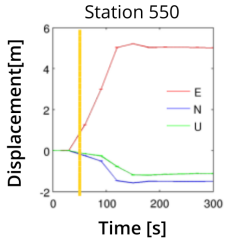
Japanese GEONET GPS network



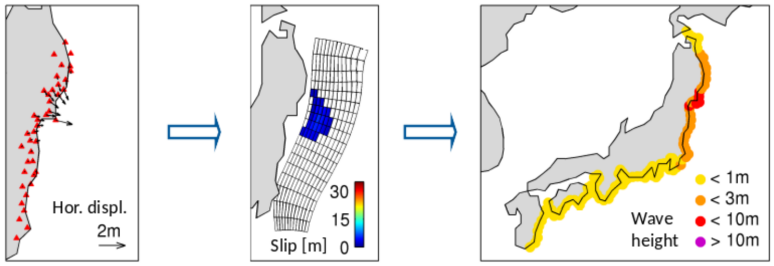
Excursion: Tohoku 2011 Hindcasting Study III

gempa

T=60 s



Max. displ. [m]	1.3
Max. slip [m]	5.5
Mw	**8.4**
Tsun. energy [10^{13} J]	5
Max. wave height [m]	**5**

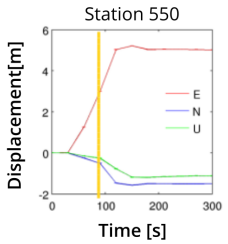


GNSS vectors | Source model | Warning perspective

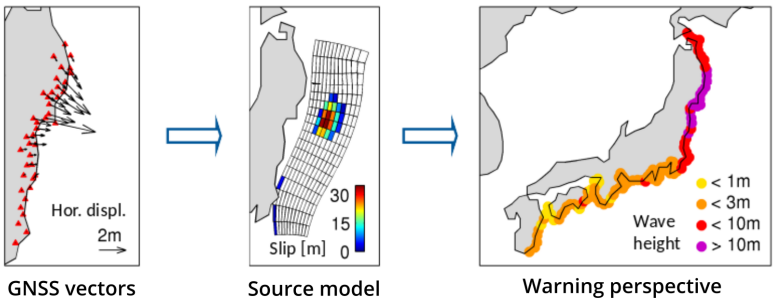
Excursion: Tohoku 2011 Hindcasting Study IV

gempa

T=90 s



Max. displ. [m]	3.0
Max. slip [m]	37
Mw	**8.7**
Tsun. energy [10^{13} J]	136
Max. wave height [m]	**28**

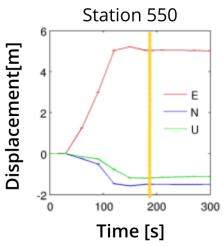


GNSS vectors | Source model | Warning perspective

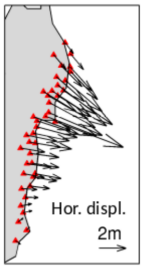
Excursion: Tohoku 2011 Hindcasting Study V

gempa

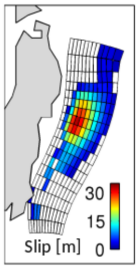
T=180 s



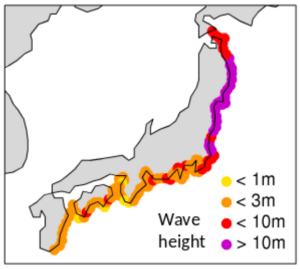
Max. displ. [m]	5.2
Max. slip [m]	33
Mw	**9.0**
Tsun. energy [10^{13} J]	267
Max. wave height [m]	**29**



GNSS vectors



Source model



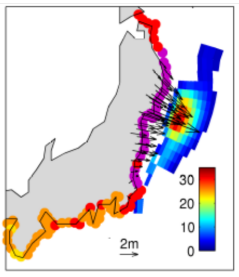
Warning perspective

Excursion: Tohoku 2011 Hindcasting Study VI

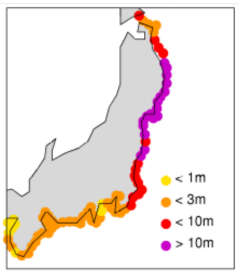
gempa

Time [s]	60	90	180
Max. displ. [m]	1.3	3.0	5.2
Max. slip [m]	5.5	37	33
Mw	8.4	8.7	9.0
Tsun. en. [10^{13} J]	5	136	267
Max. wave [m]	5	28	29

Observed and predicted data after 180 seconds



Field observations [Mori et al., 2012]



- Hindcasting of the Tohoku 2011 event shows that a qualified tsunami warning could have been issued within 3-4 minutes origin time
- Coastal GNSS arrays (possibly enhanced by island based stations or buoys) are extremely valuable for near-field tsunami early warning
- See: Hoechner et al., NHESS 2013, `www.nat-hazards-earth-syst-sci.net/13/1285/2013`

Definition of the Displacement Residual in TOAST I

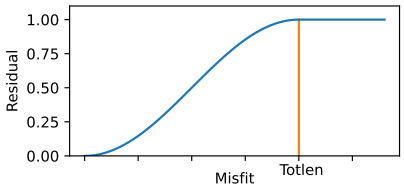
- The misfit is the sum of the squared differences between observations and simulations
- The total length is the maximum between the sum of all squared lengths and ε = 0.1 m
- ε relaxes the definition if the total length is smaller than 10 cm
- The residual is the misfit divided by (normalized by) the total length and then mapped to values between 0 (perfect fit) and 1 (bad fit) by a sine taper function

$$Misfit = \sqrt{\sum_{i}^{Stations} \sum_{j=E,N,U}^{Components} a_{ij} \cdot (d_{ij}^{o} - d_{ij}^{s})^2}$$

$$Totlen = \max\left(\sqrt{\sum_{i}^{Stations} \sum_{j=E,N,U}^{Components} a_{ij} \cdot (d_{ij}^{o})^2},\ \varepsilon\right)$$

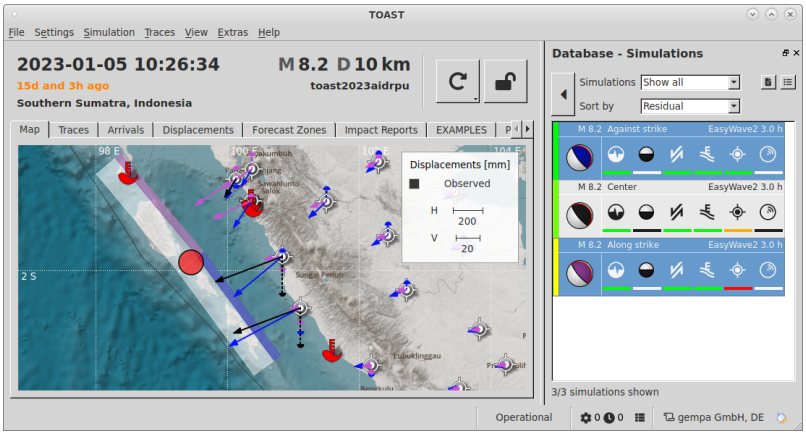
$$Residual = 1 \quad \text{if } Misfit \geq Totlen$$

$$Residual = \frac{1}{2} \cdot \sin\left(\frac{Misfit}{Totlen} \cdot 180 - 90\right) + \frac{1}{2} \quad \text{if } Misfit < Totlen$$



Definition of the Displacement Residual in TOAST II

Residual for simulations with different propagation direction

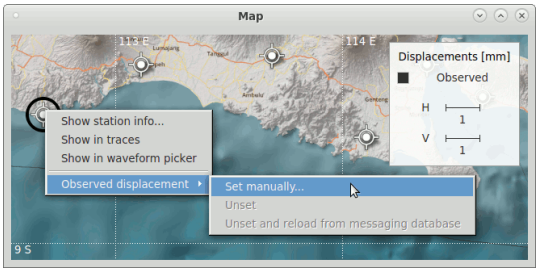


- Two simulations are selected: Propagating along strike and against strike
- In this case, against strike has smallest displacement- and overall residual

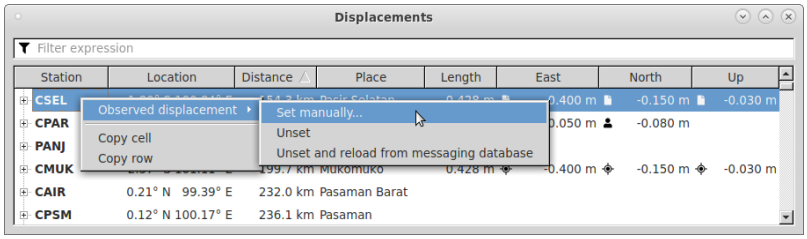
Manually entering observed displacements in TOAST I

gempa

- Manual input of observed displacements via context menu in Map perspective



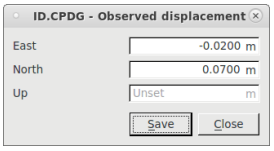
- Manual input of observed displacements via context menu in Displacements perspective



Manually entering observed displacements in TOAST II

gempa

- Manual displacement input dialog



- Not every component has to be entered. Horizontal and vertical components are treated independently in display and residual computation.

Automatically receiving displacement amplitudes I

gempa

- gdisp: SeisComP module to automatically compute displacements (in testing phase)
- Similar to SeisComP amplitudes
- Principle:
  - For an event, determine potentially affected stations depending on origin and magnitude
  - Compute theoretical P- and S-wave arrivals
  - Determine pre- and post-event time windows based on arrivals, magnitude and distance
  - Compute displacements and uncertainties by averaging over time windows
  - Send to SeisComP messaging / DB
- In TOAST:
  - Receive displacement amplitudes by SeisComP messaging
  - Create TOAST displacement objects
  - Visualize displacements
  - Compute residuals
  - Rank simulations

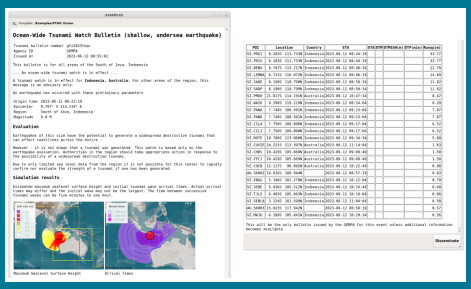
Importing displacement amplitudes from an XML file

gempa

- Select an incident
- Open import dialog in menu *File > Import > Displacement amplitudes...*
- The gdisp module by default also stores computed amplitudes as file (XML and JSON)
- Files with displacements corresponding to historical or artifical events can be used for training purposes

4.10 TOAST - Templates

TOAST - Templates



Marit Möller, Dr. Bernd Weber, Dr. Andreas Hoechner and TOAST team

gempa GmbH, Potsdam, Germany

Outline

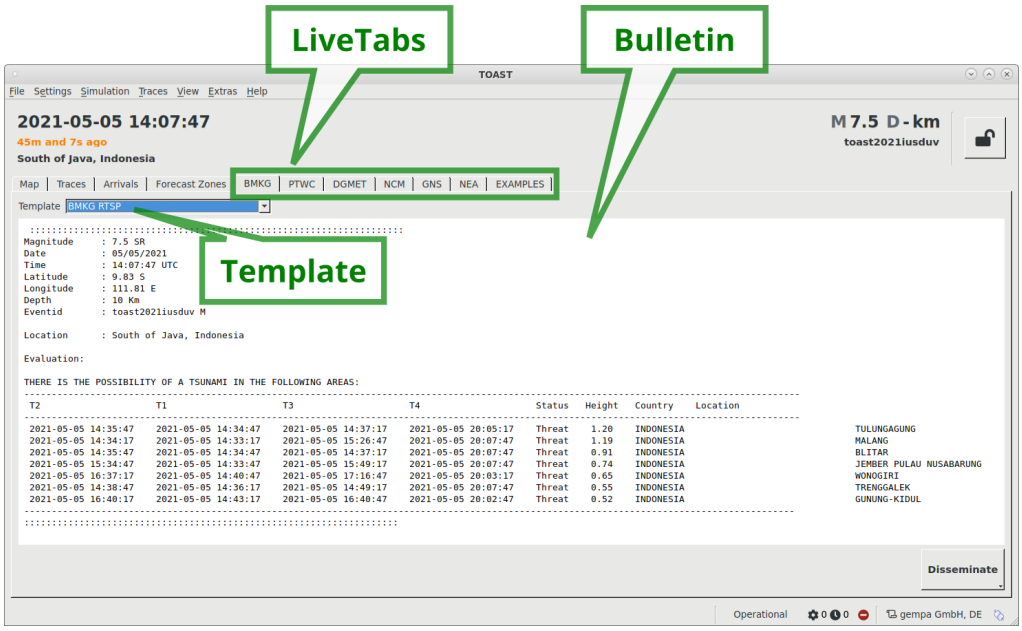
Motivation

gempa

- After creating and evaluating tsunami simulations, the next task is to generate warning bulletins
- For this purpose, TOAST uses templates based on ClearSilver.
- These templates are rendered, that is they are filled with content by TOAST using event and simulation information to generate bulletins.
- The bulletins are shown interactively in TOAST in the configurable LiveTabs.
- The templates can also be used to create and export various formats such as text, html, images, videos or tweets.

Text Bulletin in TOAST LiveView

gempa



HTML Bulletin with Images and Table

Ocean-Wide Tsunami Watch Bulletin (shallow, undersea earthquake)

Tsunami bulletin number toast2021iusduv
Agency ID
Issued at 2021-05-05 14:13:03

This bulletin is for all areas of the South of Java, Indonesia

... An ocean-wide tsunami watch is in effect ...

A tsunami watch is in effect for **Indonesia, Australia, UK**. For other areas of the region, this message is an advisory only.

An earthquake has occurred with these preliminary parameters

Origin time 2021-05-05 14:07:47
Epicenter 9.832° S 111.813° E
Region South of Java, Indonesia
Magnitude 7.5 M

Evaluation

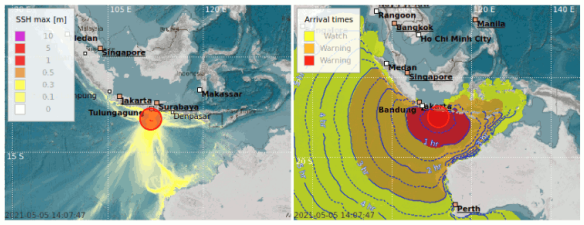
Earthquakes of this size have the potential to generate a widespread destructive tsunami that can affect coastlines across the entire .

However - it is not known that a tsunami was generated. This watch is based only on the earthquake evaluation. Authorities in the region should take appropriate action in response to the possibility of a widespread destructive tsunami.

Due to only limited sea level data from the region it is not possible for this center to rapidly confirm nor evaluate the strength of a tsunami if one has been generated.

Simulation results

Estimated maximum sealevel surface height and initial tsunami wave arrival times. Actual arrival times may differ and the initial wave may not be the largest. The time between successive tsunami waves can be five minutes to one hour.



Maximum Sealevel Surface Height Arrival Times

POI	Location	Country	ETA	OTA	OTM	OTMSSH(m)	OTP(min)	Runup(m)
VZ.SADE	8.190S 110.798N	Indonesia	2021-05-05 14:40:47					0.65
VZ.PRGI	8.283S 111.733N	Indonesia	2021-05-05 14:36:47					0.45
VZ.PRIG	8.283S 111.733N	Indonesia	2021-05-05 14:36:47					0.45
VZ.WAIK	9.390S 119.219N	Indonesia	2021-05-05 15:28:17					0.32

Changes from TOAST Legacy to TOAST multiuser version

- With the new TOAST multiuser version, template and livetab functionality was extended significantly.
- Previously, templates were configured in TOAST (toast.cfg) and re-read from file system each time before rendering or disseminating.
- The same, currently configured templates were used for all incidents.
- Now, templates are configured at the TOAST server in a tree structure.
- The Live tab configuration is still done at the TOAST client but is more versatile.
- Functionality of the templates was enhanced significantly.

Template Concept TOAST multiuser version I

gempa

- Templates are configured at the TOAST Server, more precisely in the TOAST daemon plugin section *toastd* of scmaster (file: *scmaster.cfg*).
- When an incident is created, all configured templates are stored in the database together with the incident.
- Templates can be edited from within the TOAST client.
- These changes affect only the templates of the currently selected incident.

Template Concept TOAST multiuser version II

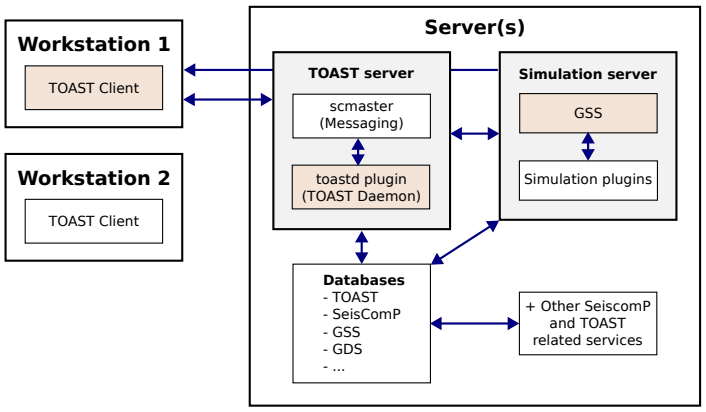
gempa

- The Live tab configuration is done at the TOAST client (file: *toast.cfg*) and supports entry points to the template tree.
- Template variables were added which are configured at TOAST server and edited with a dedicated variable editor from within the TOAST client.
- A revision variable for each template counts the number of times a template has been disseminated.
- Several new ClearSilver functions were added to extend the bulletin functionality.

Template Concept TOAST multiuser version III

gempa

TOAST-multiuser version



- Templates are configured at the TOAST server.
- Live tabs are configured at the TOAST client.

Documentation

gempa

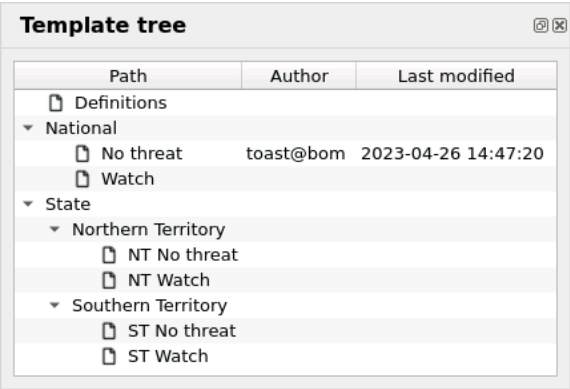
- The online documentation for TOAST can be found at:
  `https://docs.gempa.de/toast/current/`
- **Note that the online documentation is not yet adapted to the TOAST multiuser configuration!**
- The up-to-date documentation is located within the VM (as well as on the test system):
  `file:///home/tews/seiscomp-gui/share/doc/toast/html/index.html`
- More specifically:
  - Live tabs and templates configuration
    `file:///home/tews/seiscomp-gui/share/doc/toast/html/base/installation.html#bulletins-templates-and-live-tabs-configuration`
  - Create warning bulletins and other output using templates
    `file:///home/tews/seiscomp-gui/share/doc/toast/html/base/export.html`

Configuration - Templates I

- The templates are configured in a queue of scmaster, typically the Production queue.
- The toastd plugin has to be added to the queue so that the templates and template groups can be set up in a tree-like fashion.
- Templates and groups can be added using the green plus-icon in scconfig: *Modules > Messaging > scmaster > queues > production > processors > messages > toastd > bulletins + Template or + Group*.
- Templates and groups have to be registered (linked).
- The configuration is saved in the file `$SEISCOMP_ROOT/etc/scmaster.cfg`.
- It is possible to add a template to more than one group.

Configuration - Templates II

Template Tree



The template tree widget in the TOAST client.

Above template tree configuration is listed in the documentation:

`file:///home/tews/seiscomp-gui/share/doc/toast/html/base/installation.html#id7`

Configuration - Templates Variables I

- Template variables are configured in a similar way as the templates.
- Use scconfig: *Modules* > *Messaging* > *scmaster* > *queues* > *production* > *processors* > *messages* > *toastd* > *bulletins* + *Variable* to add a variable profile.
- Register the variable profiles at *bulletins*.
- The variables can be accessed in the templates via ClearSilver syntax.
- The Template variables panel allows to edit them from within the TOAST client via double-click on value.
- Like the templates, the template variables are associated with an incident. That is, they are stored in the database together with an incident and modifications using the editor affect only the current incident.

Configuration - Templates Variables II

Template variables

The template variable editor in the TOAST client.

Above template variables configuration is listed in the documentation:

`file:///home/tews/seiscomp-gui/share/doc/toast/html/base/installation.html#id9`

Configuration - Live Tabs I

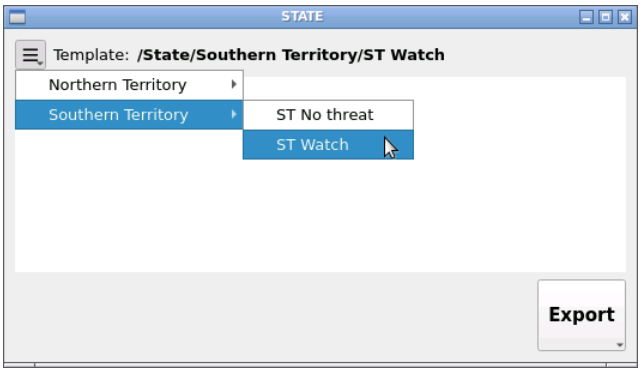
gempa

- The Live tabs are configured at the TOAST client (toast.cfg).
- If no Live tabs are configured, per default there is one tab *Live tabs* in which the complete template tree is available.
- Alternatively, an arbitrary number of Live tabs can be configured.
- Use scconfig: *Modules > gempa > toast > liveTab + Live tab profile*.
- Set the *title* and optionally *defaultTemplate*, *entryPoint* to the template tree and *buttonText* of the dissemination button.
- Register the Live tab profiles at *liveTabs*.

Configuration - Live Tabs II

gempa

Live tab example

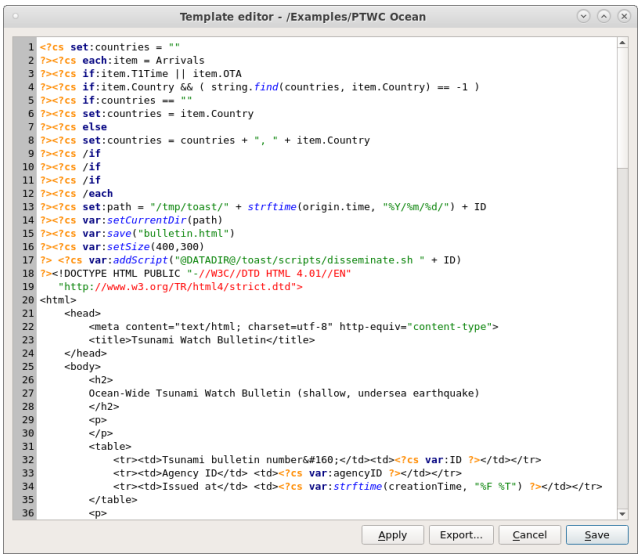


Live tab example with two states in the TOAST client.

Above live tab configuration is listed in the documentation:

`file:///home/tews/seiscomp-gui/share/doc/toast/html/base/installation.html#id11`

Template Editor I



The template editor in the TOAST client.

External Scripts

Some example shell scripts which can be used by a template after dissemination are:

- makegif.sh (create animated GIF from PNG files)
- makevideo.sh (create MP4 from PNG files)
- makegeotiff.sh (create georeferenced TIF files from PNGs saved using 'getGrid')

They are located at: `@DATADIR@/toast/scripts`

Introduction - ClearSilver

gempa

- ClearSilver is a simple, fast and language-neutral HTML template system
- It allows non-programmers to create and modify templates
- The syntax supports variable substitution, conditionals, loops, functions, local variables etc.
- Each command starts with the opening tag `<?cs` and ends with the closing tag `?>`
- For more information, see:
- https://docs.gempa.de/toast/current/base/export.html#clearsilver-template-syntax
-
- file:///home/tews/seiscomp-gui/share/doc/toast/html/base/export.html#clearsilver-template-syntax
-
- https://github.com/blong42/clearsilver/wiki
- https://github.com/blong42/clearsilver/wiki/Template-Syntax

TOAST ClearSilver Variables

gempa

In adition to the built-in ClearSilver variables, TOAST adds amongst others the following:

- ID = Id of the event
- agencyID = Id of the agency
- creationDate = Creation date of the bulletin
- origin.depth = Depth of the earthquake in km
- origin.latitude = Latitude coordinate of the epicenter in degree
- origin.longitude = Longitude coordinate of the epicenter in degree
- origin.magnitude = Magnitude of the earthquake
- origin.magnitude.type = Magnitude type of the earthquake
- origin.region = Region of the earthquake
- origin.time = Time of Origin in UTC

Example for usage in template: `<?cs var:agencyID ?>`

TOAST ClearSilver functions I

gempa

Please consult the TOAST documentation for an extensive list of TOAST Clearsilver functions and variables.

Some common TOAST ClearSilver functions:

- setCurrentDir()
- save()
- addScript()
- useLocalTime()
- isLive()

TOAST ClearSilver functions II

gempa

Some functions related to image creation:

- setGradientProfile()
- showCurrentStepTime()
- addGrid()
- addLayer()
- setDisplayRect()
- setOriginSymbol()
- setWatermark()
- alignLegends()
- getGrid()
- render()

TOAST Example Templates

gempa

- TOAST example templates are provided with TOAST and are located at:
  `@DATADIR@/toast/templates`
- Example scripts executed by the templates are stored at:
  `@DATADIR@/toast/scripts`
- In the examples below, output is stored at:
  `/tmp/toast`
- **Note:** Don't use the example files directly, they are overwritten upon update. Instead, copy and rename them by removing the extension `.example`.

Examples - Creating Text Output using Variables

gempa

As an example on how to use variables, the template snippet:

```
Agency : <?cs var:agencyID ?>
Magnitude : <?cs var:float(origin.magnitude, 1) ?>
Date : <?cs var:strftime(origin.time, "%m/%d/%Y") ?>
Time : <?cs var:strftime(origin.time, "%T") ?> UTC
Latitude : <?cs var:strfcoord(origin.latitude, "%.2F %c") ?>
Longitude : <?cs var:strfcoord(origin.longitude, "%.2F %C") ?>
Depth : <?cs call:map_dep(float(origin.depth, 0)) ?> km
Location : <?cs var:origin.region ?>
```

might generate following text output:

```
Agency : BMKG
Magnitude : 5.8
Date : 11/11/2015
Time : 23:36:26 UTC
Latitude : -7.34
Longitude : 129.00
Depth : 144 km
Location : Banda Sea
```

Example - Using Loops and Conditionals

gempa

Loop over an iterable using: `<?cs each:item = Iterable ?>` closed by `<?cs /each ?>`.
Conditionals can be created with: `<?cs if:Condition ?>... <?cs /if ?>`.
For instance, to generate an Arrivals table, following template snippet can be used:

```
-------------------------------------------------------------------------------------------
T1 Height Location
-------------------------------------------------------------------------------------------
<?cs each:item = Arrivals ?><?cs if:item.T1Value
?><?cs var:item.T1Time ?> <?cs var:float(item.Runup, 2) ?> <?cs var:item.Country
?><?cs /if ?><?cs /each ?>
```

Or similarly for Forecast Zones:

```
<?cs each:item = ForecastZones ?><?cs if:item.T1Time
?><?cs var:item.T1Time ?> <?cs var:float(item.Runup, 2) ?> <?cs var:item.Country
?><?cs /if ?><?cs /each ?>
```


Example - Template Variables and Test Mode

gempa

- Enable testMode in TOAST
- Add test content or scripts to your templates
- Template variables can be accessed by using the name and as prefix 'incidentVar'

```
<?cs if:testMode ?>
###############################################################################
#
# <?cs var:incidentVar.exerciseTestStr ?>
#
###############################################################################
<?cs /if ?>
```

- In this way, bulletin content and recipients can be changed for test mode

Example - Revision Counter

gempa

- Each template has its own revision counter
- When the incident is created, it has the value 1
- It is increased by 1 upon each dissemination
- The revision counter can be accessed by: `<?cs var:revision ?>`

```
This is Bulletin type 4 in revision <?cs var:revision ?>.
```


Example - Including Templates

gempa

Includes are used to share functionality across multiple templates or repetitive text.
For example in `/STATE/Western Australia/Watch`:

```
<?cs include:"/Includes/StateDefinitions"
?><?cs include:"/Includes/Definitions" ?>
```

Example - Saving Bulletins and Executing External Scripts

gempa

The functions `save()` and `addScript()` in a template are executed whenever the template is disseminated either by File → Export or the Disseminate button.
Define the path where the bulletin should be saved, set it and enable saving:

```
<?cs # set:path = "/tmp/toast/" + strftime(origin.time, "%Y/%m/%d/") + ID
?> <?cs set:path = "/tmp/toast/"
?><?cs var:setCurrentDir(path)
?><?cs var:save("aeicproduct.txt") ?>
```

Add an external script for execution:

```
<?cs var:addScript("@DATADIR@/toast/scripts/disseminate.sh " + ID) ?>
```


Example - Generate Images I

gempa

Pictures of the products like SSH Max, Arrival times oder travel times can be exported using `addGrid` and `render` or directly using `getGrid`. The image region can be set with `setDisplayRect`.

```
<?cs var:setDisplayRect("-28.797", "34.081", "57", "90")
?><?cs var:setWatermark("Copyright InaRTSP BMKG, " + strftime(currentTime(),"%Y"))
?><?cs var:setScenarioColors("blue, green")
?><?cs var:setGlobalLayerConfig("legendTextAlign=left,legendFontSize=10, legendSpacing=2,
                        legendOrientation=horizontal")
?><?cs var:alignLegends("","vertical","")
?><?cs var:addGrid("SSH max", "*", 0, "")
?><?cs var:addGrid("Arrival lines", "*", 0, "legendTitle=Arrival times")
?><?cs var:setOriginSymbol("star", true)
?><?cs var:render("rtspmap_sshMax.png", false)
?>
```

Example - Generate Images II

gempa

The isLive() function can be used to explicitly determine whether a template is executed within a LiveTab or by export/dissemination

```
<?cs if:!isLive()
?><?cs var:addGrid("Arrival lines", "*", 0, "legendTitle=Arrival times, arrivalFontSize=10")
?><?cs var:setOriginSymbol("star", true)
?><?cs var:render("rtspmap_arrivalTimes.png", false)

?><?cs var:addLayer("forecast zones", "gradient=rtsp, showLegend=true, legendTitle=WarningStatus,
                           drawFilled=false, filter=" +list)
?><?cs var:setOriginSymbol("star", true)
?><?cs var:render("rtspmap_warningzones.png", false)

?><?cs set:filename = "rtsp_ssh_max_overlay.png"
?><?cs var:getGrid("SSH max", "*", 0, filename)

?><?cs set:filename = "rtsp_travel_times_overlay.png"
?><?cs var:getGrid("Arrival times", "*", 0, filename)
?><?cs /if ?>
```


Example - Create HTML Forecast Zones Output I

gempa

To create a bulletin in HTML format, combine HTML syntax with ClearSilver content. For instance, to create an HTML file with the Forecast zones, see the example:

`@DATADIR@/toast/templates/forecast_zones.html.example`:

```
1  <?cs set:path = "/tmp/toast/" + strftime(origin.time, "%Y/%m/%d/") + ID
2  ?><?cs var:setCurrentDir(path)
3  ?><?cs var:save("forecast_zones.html") ?><!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01//EN"
4    "http://www.w3.org/TR/html4/strict.dtd">
5  <html>
6     <head>
7        <meta content="text/html; charset=utf-8" http-equiv="content-type">
8        <title>Forecast Zones</title>
9     </head>
10    <body>
11       <table border="1">
12          <tr>
13             <th>Name</th>
14             <th>Place</th>
15             <th>Country</th>
16             <th>T1</th>
17             <th>T3</th>
18             <th>T3(m)</th>
19             <th>Runup(m)</th>
20             <th>GeoCode</th>
21          </tr>
```

Example - Create HTML Forecast Zones Output II

```
        <?cs each:item = ForecastZones ?>
        <tr>
              <td><?cs var:item.Name ?></td>
              <td><?cs var:item.Place ?></td>
              <td><?cs var:item.Country ?></td>
              <td><?cs var:strftime(item.T1Time, "%F %T") ?></td>
              <td><?cs var:strftime(item.T3Time, "%F %T") ?></td>
              <td align="right"><?cs var:float(item.T3Value, 2) ?></td>
              <td align="right"><?cs var:float(item.Runup, 2) ?></td>
              <td><?cs var:item.Geocode ?></td>
        </tr>
        <?cs /each ?>
      </table>
   </body>
</html>
```


Examples - Create HTML preview and geotiff output I

See the example:

@DATADIR@/toast/templates/ssh_max_arr_lines.tpl:

```
<?cs set:creationTime = strftime(currentTime(), "%Y-%m-%d_%H:%M:%S")
?><?cs set:path = "/tmp/toast/simulation/" + ID + "/"
?><?cs each:item = simulations
?><?cs set:path = path + item.id
?><?cs if !last(item) ?><?cs set:path = path + "_" ?><?cs /if
?><?cs /each
?><?cs set:fileName = creationTime + "_ssh_max_arr_lines"
?><?cs set:fileName = "ssh_max_arr_lines"
?><?cs var:setCurrentDir(path)
?><?cs var:setWatermark("NEA " + strftime(currentTime(), "%Y"))
?><?cs var:save(fileName + ".html")
?><?cs var:addScript("@DATADIR@/toast/scripts/makegeotiff.sh " + fileName + ".png "
                + map.box.left + " " + map.box.top + " " + map.box.right + " " + map.box.bottom)
```

Examples - Create HTML preview and geotiff output II

```
?><!DOCTYPE html>
<html>
   <head>
      <meta content="text/html; charset=utf-8" http-equiv="content-type">
      <title>SSHmax and Arrival lines</title>
   </head>
   <body>
      <pre>
Path: <?cs var:path ?>
File name: <?cs var:fileName ?>
Creation time: <?cs var:creationTime ?>
Event-ID: <?cs var:ID ?>
Sim-ID(s): <?cs each:item = simulations ?><?cs var:item.id ?>
           <?cs /each ?>
Map view: left / top / right / bottom
           <?cs var:map.box.left?> / <?cs var:map.box.top?> / <?cs var:map.box.right?> / <?cs var:map.box.bottom?></pre>
      <img src="<?cs
         var:setSize(1280, 960) ?><?cs
         var:addGrid("SSH max", "*", 0, true) ?><?cs
         var:addGrid("Arrival lines", "*", 0, true) ?><?cs
         #var:addLayer("forecast zones", "drawInactive=true, drawInactiveColorized=true, drawFilled=true, inactiveLineColor=#
         var:setOriginSymbol("circle", false) ?><?cs
         var:setRenderOptions("mapProjection=Rectangular") ?><?cs
         var:renderMeta(fileName + ".png", true)
         ?>" alt = "SSH_max_Arrival_lines">
   </body>
</html>
```


Examples - Create HTML preview and geotiff output III

The associated script for above example is: `@DATADIR@/toast/scripts/makegeotiff.sh`:

```
#!/bin/bash
# $1-5: filename left top right bottom
fi=$1
fo=$(echo "$fi" | sed "s/png/tif/")
echo -e "Creating GeoTiff $fo " > mgt.out
echo -e "With corners $2 $3 $4 $5" >> mgt.out
#gdal_translate -a_nodata 0 -of GTiff -a_srs EPSG:4326 -co COMPRESS=JPEG -a_ullr $2 $3 $4 $5 $fi $fo >> mgt.out
gdal_translate -a_srs EPSG:4326 -co COMPRESS=JPEG -a_ullr $2 $3 $4 $5 $fi $fo >> mgt.out
# note: ullr is left top right bottom and not top left bottom right
```

Example - Video Generation I

gempa

Example for a ClearSilver template for video export:
@DATADIR@/toast/templates/video.example

```
<?cs var:setWatermark("Copyright gempa GmbH " + strftime(currentTime(), "%Y"))
?><?cs var:showCurrentStepTime(true)
?><?cs set:path = "/tmp/toast/video/" + strftime(currentTime(), "%Y%m%dT%H%M%S")
?><?cs var:setCurrentDir(path)
?><?cs var:addScript("@DATADIR@/toast/scripts/makevideo.sh " + ID)
?><?cs loop:x = #0, #availableTime, #300
?><?cs var:addGrid("SSH", "*", x, true)
?><?cs var:render(x + ".bmp", false)
?><?cs /loop?>
```


Example - Video Generation II

gempa

The external shell script used in the example above:
@DATADIR@/toast/scripts/makevideo.sh.example

```
#!/bin/bash
#$1 - Event ID
shopt -s extglob
files=`ls +([0-9]).bmp | sort -n`
files2=`echo $files | sed -e s/\ /,/g` # add commas for separation
opt="vbitrate=1800000:mbd=2:keyint=132:vqblur=1.0:cmp=2:subcmp=2:dia=2:mv0:last_pred=3 -really-quiet"
mencoder "mf://$files2" -mf fps=2 -ovc lavc -lavcopts vcodec=msmpeg4v2:vpass=1:$opt -nosound -oac copy -o $1.mp4
status=$?
if [ $status -eq 0 ]
  then echo "Video encoding successful"
else
  echo "Video encoding not successful" >&2
fi
rm $files
```

Example - Test Mode

gempa

- Enable testMode
- Via status bar, the Menu → Extras or short cut CTRL+T
- Add test content or scripts to your templates

```
<?cs if:testMode ?>
TEST * TEST * TEST * TEST * TEST
<?cs /if ?>
```

- In this way, bulletin content and recipients can be changed for test mode

Exercise 1: Modify a template

gempa

1. Create an incident
2. Open the template editor and modify a template.
3. Save the template.
4. Check that the rendered bulletin contains the modifications.

Exercise 2: Create and configure a new template

gempa

1. Create a template on the file system
2. Configure the template in *scmaster* using scconfig.

```
sc-tews exec scconfig
```

3. Restart scmaster and TOAST client.

```
sc-tews restart scmaster
```

4. Create a new incident.
5. Check if the new template is present in the template tree.

Exercise 3: Configure a new live tab

gempa

1. Configure the live tab in *toast* using scconfig.

```
sc-gui exec scconfig
```

2. Restart the TOAST client.
3. Check if the new live tab is shown.

Exercise 4: Time zone conversion

gempa

1. Open the new template in the editor.
2. Add the current time using a ClearSilver function.
3. Check out the template tree at Includes > Definitions for inspiration.
4. Add a new variable with datetime converted to Melbourne time.
5. Create a new incident.
6. Check if the new template is present in the template tree.

Exercise 5: Add a table with warning level of forecast zones

gempa

1. Use the template from the last exercise or add a new one.
2. Iterate over forecast zones.
3. Print zone name, warning level, T1 (arrival time), and wave height.

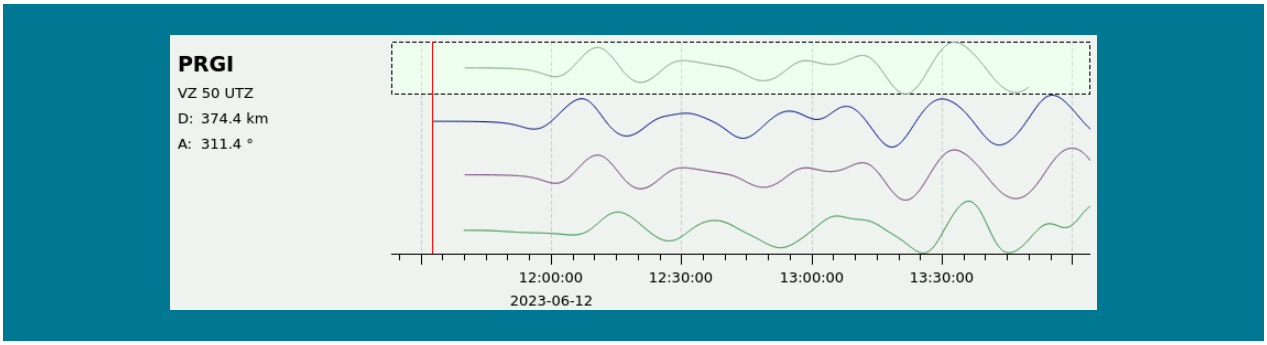
Exercise 6: Add a template variable

gempa

1. Configure a template variable using scconfig
2. Use the template variable in a template.
3. Restart scmaster and TOAST and create a new incident.
4. Modify the variable using the template variable editor in the TOAST client.

4.11 TOAST Simulation Playback

TOAST - Simulation Playback



Dr. Andreas Hoechner

gempa GmbH, Potsdam, Germany

Outline

TOAST - Simulation Playback I

gempa

- The TOAST-multiuser version has the new feature to export simulated sea level observation time series and event metadata from a simulation.
- The exported data can be used in a playback for training or testing purposes.
- The instructions are in the TOAST documentation at *Interactive Analysis* > *Simulations* > *Simulation playback*.

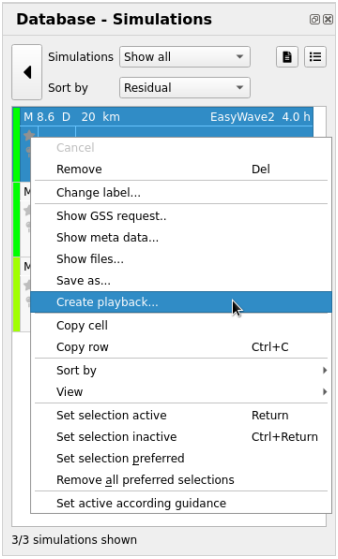
TOAST - Simulation Playback II

gempa

- The export of a simulation for playback is done using the TOAST client.
- The playback is started using the command-line tool toast-playback, which is part of the TOAST client package.
- Some steps in the setup of the playback may require TOAST server ownership.
- It is **urgently** recommended to perform the playback on a dedicated and not an operational system to avoid contamination of the database and waveform archive!

Create simulation playback I

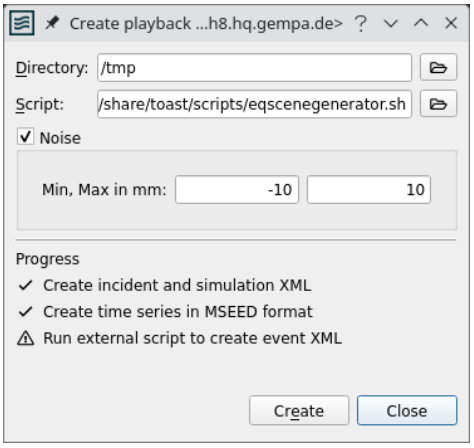
- To export an EasyWave simulation, right-click on a simulation in the database widget and select *Create playback...*
- Note that the export is only possible for EasyWave simulations, as currently only those contain the required sea level observation time series.
- Note that the station codes in the inventory have to conform to the SEED standard (max. 5 character station code) as miniseed format is used.



Create playback dialog

Create simulation playback II

- Change the directory if desired. Note that the TOAST incident ID is added to the end of the path.
- *Script* points to an additional script which is executed after the playback is created.
- Uniform noise of configurable amplitude can be added to the time series.
- Click *Create*.
- If one of the steps fails, hover the mouse over the *warning* icon to get more information.



Create playback dialog

Create simulation playback III

- After creation, the playback directory contains the following data:
  - The simulated time series of all triggered stations in MSEED format in the file *data.mseed*.
  - The incident meta data in XML format in the file *incident.xml*. This contains the event type information of the incident.
  - The simulation meta data in XML format in the file *simulation.xml*. This comprises location and magnitude.
  - The directory *event* which is created by the default script.
- The time series are padded with zeros plus noise from origin time to the start of the simulated data.
- Additionally, approximately one hour of zeros with noise is added prior to origin time. This is to allow manual picking (Show waveforms) as the waveform processor requires a certain minimum number of samples.

Create simulation playback IV

- An external script is called after the playback data has been exported.
- The default script can be configured using scconfig at `playbackExternalScript`.
- By default a shell wrapper script which calls a Python script is configured.
- It adds the directory *event*, with several SeisComP event XML files in zipped and non-compressed versions. The zipped files are used for playback, the non-zipped can easily be inspected.
- The event updates have randomized magnitudes and origins which converge to the actual (final) value.
- It also adds the file *event.log* which is **required** by toast-playback and contains the information when the event and its updates are to be sent.
- Inspect the external script for more details.

Inspect simulation playback

gempa

- The XML files can be inspected using:

```
firefox simulation.xml
```

- Hint: an XML file can be pretty-printed like this:

```
xmllint --format simulation.xml -o simulation.xml
```

- The miniseed records can be displayed using the SeisComP trace viewer scrttv:

```
scrttv data.mseed
```

- *After* the playback the data in CAPS can be displayed with the trace viewer:

```
scrttv --offline --no-inventory -I caps://localhost --streams.codes=*.*.* --
    ↪ buffer-size 7200
```

- or using the CAPS webinterface.

Run simulation playback I

gempa

- The playback is started with the commad-line tool toast-playback, which is part of the TOAST client package.

```
sc-gui exec toast-playback <directory>
```

- It sends the event information to QuakeLink and the simulated sea level observation time series to CAPS. Note that the QuakeLink package has to be installed.
- Before starting the playback:
  - Check that toast-playback has a connection to QuakeLink and CAPS.
  - The normal data acquisition has to be stopped (e.g. rs2caps, caps2caps, bomslo2caps).
  - The ql2sc module has to be running so that the events are forwarded to the messaging.

Run simulation playback II

gempa

- The QuakeLink and CAPS targets for toast-playback can be specified on command line using the options `-Q` and `-C` respectively.
- With the option `-T` or `--event-lead-time` the lead time to the first event update can be set. Default value is 300 seconds.
- When using `--test` no data is sent.
- As usual, `-h` or `--help` list all options.

Configuration I

gempa

- toast-playback sends events, origins and magnitudes to the QuakeLink server.
- The module ql2sc (QuakeLink-to-SeisComP) forwards them to the SeisComP messaging, where they can be processed by other modules. Set in *ql2sc.cfg*:

```
host.proc.routingTable = Pick:IMPORT_GROUP,Amplitude:IMPORT_GROUP,
    ↪ FocalMechanism:EVENT,Origin:EVENT,Event:EVENT
```

- Make sure that ql2sc points to the host and queue which is the source for the TOAST daemon:

```
connection.server = localhost/seiscomp
```

- or, if seismic processing of an other SC messaging should be used:

```
connection.server = proc/production
```

Configuration II

gempa

- Avoid unnecessary processing by scevent by appending the agency to the blacklist in the global section of *scevent.cfg*, e.g.:

```
processing.blacklist.agencies = PLAYBACK
```


View simulation playback in TOAST client I

gempa

- toast-playback announces on the command line when the first event and consecutive updates are sent to QuakeLink.
- If configured so, the TOAST server then automatically creates an incident and initiates simulations.
- Depending on configuration, the TOAST client automatically opens the new incident and shows the progress of the simulations.
- The simulated sea level observations are shown in *Traces* perspective.
- The observations can be picked for arrival times and amplitudes using *Show waveforms...* in *Arrivals* perspective.

View simulation playback in TOAST client II

The observed sea level observations can be picked for arrival times and amplitudes using *Show waveforms...* in *Arrivals* perspective.

View simulation playback in TOAST client III

- It is recommended to view the time series in the traces tab and waveform picker without a filter applied (*Raw*). There are no tides which need to be removed and the *Tsunami* filter applies a long taper from the beginning of the trace which reduces filter artifacts but also distorts the actual signal.
- Note that arbitrary filters can be added via configuration of the TOAST client.

Clear CAPS archive

gempa

- In order to clear the CAPS archive
  1. Stop CAPS
  2. Create backup if required
  3. Remove the CAPS data archive
  4. Start CAPS

```
sc-proc stop caps
rm -rf /home/data/archive/caps
sc-proc start caps
```

- The archive path is configured in *caps.cfg*

```
# Defines the path to the archive directory.
AS.filebase = /home/data/archive/caps
```

- This procedure completely clears the archive. Be careful!
- To restore the archive, stop CAPS, copy back the backup and start CAPS.

Exercise I

gempa

1. Create an artificial incident.
2. Add an EasyWave simulation.
3. Export the simulation.
4. Optional: Exchange the playback directory with an other course participant.
5. Stop caps2caps (or the respective employed acquisition module):

```
sc-proc stop caps2caps
```

```
sc-proc stop rs2caps
```

6. Start the playback:

```
sc-gui exec toast-playback <sim-directory-name>
```

Exercise II

gempa

- Observe the automatic creation of incidents and simulations.
- Study the forecast zone threat levels, the arrivals and bulletins.
- Compare how well the simulations match with the input data.
- Pick arrivals and amplitudes on the observation time series using the waveform picker.

4.12 SeisComP What's New

gempa

SeisComP: What's New?
as of 6.0.0

Dr. Dirk Rößler and the team of gempa

gempa GmbH, Potsdam, Germany

Changes as of SeisComP version 6.0.0 I

gempa

trunk:

- Support for Qt 4 is dropped.
- Artificial origins: Allow pasting of hypocenter coordinates with high precision.
- Changed `KM_OF_DEGREE` constant according to WGS84 mean radius definition.
- Changed default values of Wood-Anderson instrument filter to recommendations by IASPEI magnitude group, 2011 and Uhrhammer et al., 1990. The change systematically reduces magnitudes by 0.13 when making use of amplitudes measured on waveforms corrected for Wood-Anderson seismometers with default.
- New Concepts section about Locators in SeisComP in documentation.
- New event types: volcano tectonic, volcanic long period, volcanic very long period, volcanic hybrid, volcanic rockfall, volcanic tremor, pyroclastic flow, lahar
- Do not log database connection credentials for protecting user accounts.

Changes as of SeisComP version 6.0.0 II

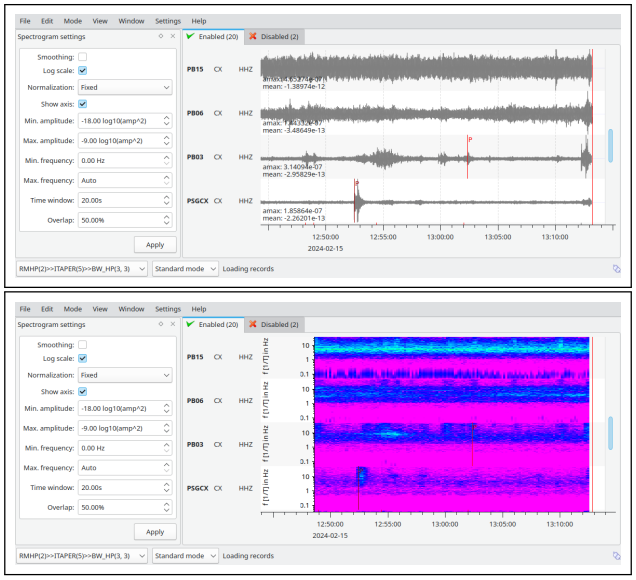
magnitudes:

- Compute ML peak-to-trough and mb amplitudes according to IASPEI recommendations if configured with `amplitudes.iaspei = true`.
- Simplify configuration of magnitude regionalization by global module configuration in scconfig.
- Add depth check to magnitude regionalization for 3D checks.
- Allow creating magnitude aliases by configuration of `magnitudes.aliases` in global module configuration and magnitude type profiles in global bindings.
- Add a Magnitudes section to the documentation of concepts.
- Allow configuration of time windows based on time grammar for more precise measurements preventing amplitude measurements on surface waves, noise, subsequent events, etc.

Changes as of SeisComP version 6.0.0 III

- **scrttv:**
  - Allow calculating spectrograms.
  - Spectrogram view can be interactively adjusted by Settings window.

Spectrogram plot with control window



Changes as of SeisComP version 6.0.0 IV

scolv:

- Default amplitude-time windows in amplitude picker can be restored after manual changes (Shift + W).
- The length of the zoom window can be reset to the trace overview in amplitude picker.
- Location tab: Preserve arrival definition flags (backazimuth, slowness) when committing from picker if a pick is not enabled.
- In amplitude picker, the dropdown boxes of measure type and combiner are pre-selected from global bindings.

scesv:

- Show event-type information in GUI.
- Fix regression which prevented to show the current magnitudes when *showLastAutomaticSolution = true*.

Changes as of SeisComP version 6.0.0 V

screpick:

- New module for automatically repicking existing picks, e.g., with new methods.

scardac:

Highly optimized since

- Only data chunks are scanned which were updated since last scan.
- Time range parameters limit the amount scan files.
- Waveform filtering based on ID confines the scan.
- Allow filtering by channels (`--nslc`).

scorgls/scevtls:

- Support processing event XML files instead of reading from database. (`--input`).

Changes as of SeisComP version 6.0.0 VI

scautoloc:

- Consider configuration of LOCSAT interface. This is important, when picks contain measurements of slowness or backazimuth, e.g., from array measurements of feature extraction by scautopick, which shall not be used automatically.

Hypo71:

- Use file rotator including deleting old files preventing overflow of log files.
- By default log into *@LOGDIR@/HYPO71.LOG*.
- The numbers of stations and phase written to new origins are fixed.

invextr:

- Support inventory filtering by NSLC lists (`--nslc`).

scevtstreams:

- Support stream filtering by NSLC lists (`--nslc`).

Changes as of SeisComP version 6.0.0 VII

scdbstrip:

- Allow stripping database by time window.
- Default is now: do not delete anything preventing unwanted loss of data.

SeisComP tool:

- Add command `print variables`.
- Add new documentation.

scinv:

- Add checking streams for number of channels, number != 1 or != 3 are reported.
- Add checking streams for G, H, L or N sensors whether 3C channels are orthogonal. The tolerance is 5 degree.

scmapcut:

- Support plotting multiple events on map including events from XML file.

Changes as of SeisComP version 6.0.0 VIII

gempa

scquery:

- Allow printing the database query (`--print-query-only`) instead of actually making the query. This may be useful for custom queries on the command line.

scconfig:

- Allow checking of individual files by right-clicking on file name.

fdsnws:

- Output full precision in event text format
- Fix exception in availability access test and authorization error.
- Add configuration option `inventoryCoordinatePrecision` allowing to obfuscate inventory geographic coordinates for more privacy of station hosts.

Changes as of SeisComP version 6.3.0 I

gempa

seedlink:

- New OptoDAS plugin for Opto DAS recorder (fiber optics)

trunk:

- **New filter**
  - *BPENV()*: envelope filter with band-bass filter effectively mimicking an envelope based in Hilbert transform
  - *RUD()*, *RND()*: random signal generators with uniform and normal distribution, respectively. When applied to data, the data samples are replaced by the random signal. For adding noise use the '+' operator.
    Example: *self+RUD(-10,10)»BW(3,0.7,2)*.

scolv:

- Handle negative channel gain and positive channel dip values: waveforms are flipped accordingly.

Changes as of SeisComP version 6.3.0 II

magnitudes:

- Time window grammar receives `0T` variable allowing to relate begin and end time to origin time instead of trigger, e.g., for considering time computed from distance measures.

scdumpcfg:

- Support dumping the configuration values for multiple parameters instead of all or just one (-P).

scinv check:

- Report missing channel dip and azimuth.
- Report when both channel dip and gain are negative as this may be accomplished by positive values.

scevtls:

- Include IDs for events without modified date using `--modified-after` considering the creation date and time.

Changes as of SeisComP version 6.3.0 III

scevent:

- The region check plugin, evrc, now continues to work even if some polygons are wrongly defined. The issues are reported in module log.

iLoc:

- Update to version 4.2

Changes as of SeisComP version 6.4.0 I

trunk:

- More flexible **time string formats** in addition to recent one ("YYYY-MM-DD hh:mm:ss.sssss"). Now supported are:

```
YYYY-MM-DDThh:mm:ss.ssssssZ : 2025-01-01T00:00:00.000000Z
YYYY-MM-DDThh:mm:ss.ssssss : 2025-01-01T00:00:00.000000
YYYY-MM-DDThh:mm:ssZ : 2025-01-01T00:00:00Z
YYYY-MM-DDThh:mm:ss : 2025-01-01T00:00:00
YYYY-MM-DDThh:mm : 2025-01-01T00:00
YYYY-MM-DDThh : 2025-01-01T00
YYYY-DDDThh:mm:ss.ssssss : 2025-001T00:00:00.000000
YYYY-DDDThh:mm:ss : 2025-001T00:00:00
YYYY-DDDThh:mm : 2025-001T00:00
YYYY-DDDThh : 2025-001T00
YYYY-MM-DD hh:mm:ss.ssssss : '2025-01-01 00:00:00.000000'
YYYY-MM-DD hh:mm:ss :'2025-01-01 00:00:00'
YYYY-MM-DD hh:mm : '2025-01-01 00:00'
```


Changes as of SeisComP version 6.4.0 II

```
YYYY-MM-DD hh : '2025-01-01 00'
YYYY-MM-DD : 2025-01-01
YYYY-DDD : 2025-001
YYYY : 2025
```

Application for example in scevtls, scorgls, scdbstrip, scsendorigin, scqueryqc, scart, scmssort. Time formats have been added to documentation.

- Add support for Ubuntu 24.04 by scripts for installing software dependencies.
- Add CUTOFF() and STALTA2() to the documentation of filter grammar.
- Report irregular files in case the file RecordStream is used.
- Use *localhost* as default for caps RecordStream.

gfs2fep:

- Add new tool for convert BNA or GeoJSON files to files in FEP format. The new FEP files can be used to set the region names of events.

Changes as of SeisComP version 6.4.0 III

invextr:

- Support filtering inventory by time allowing to reduce the inventory size.

msrtsimul:

- The new option "*-u*" allows playing back non-515 bytes long records of miniSEED data.

scalert:

- Add filter of picks and origins by author of that object.

scevent:

- Magnitudes with evaluation status "rejected" are not preferred anymore.

scevtls:

- Allow searching for event IDs by event type.

Changes as of SeisComP version 6.4.0 IV

scamp:

- Add configuration parameter 'amptool.streamFromBindings' to measure amplitudes on the global bindings channel instead of the picked channel. Activating this parameters allows picking phases on different streams than measuring amplitudes and the mixing of sensor types, e.g., seismometers and accelerometers.

scmag:

- Suppress computing summary magnitudes from only **one single** network magnitude if new parameter is activated:

```
summaryMagnitude.singleton = true
```

scolv:

- Plot infrasound picks with inverted triangle in diagrams.
- Make the content scrollable in height and width if the monitor display is smaller than required.

Changes as of SeisComP version 6.4.0 V

gempa

scrttv:

- Display streams even if sensor coordinates are undefined unless a region restriction is used.
- Allow reading miniSEED data from stdin with 'scrttv -' which supports using scrttv in pipes on the command line.

seedlink plugins:

- reftek: Expand max stream ID length to 5 characters.
- optodas: Set gain frequency in inventory channel.
- serial: Add maRam Weatherstation V1 support.
- mws: Fix dft485 support.

iLoc:

- Update link to external auxiliary files which must be used from now on.

Changes as of SeisComP version 6.4.0 VI

gempa

StdLoc locator:

- Reject locations on the grid boundary.
- Handle missing travel-time tables for certain phases.
- Arrival distance must be epicentral not hypocentral.
- Optimize OctTree search method and remove overwhelming log messages.

Changes as of SeisComP version 6.5.0 I

GUIs:

- Support creating aliases for all GUI modules such as scolv, scrttv, scmv, ... supporting their independent and specific configuration. Example for creating aliases:

```
seiscomp alias create scolv-custom scolv
```

scrttv:

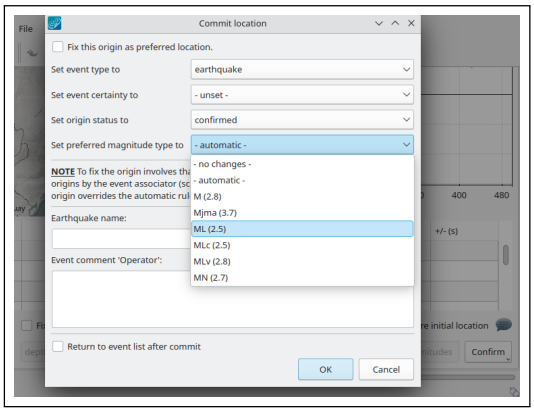
- Add option `--3c` to show all three components of the channel group configured with globa bindings in `detecStream`.
- Update menu names for more consistency with other GUIs

Changes as of SeisComP version 6.5.0 II

scolv:

- When committing with additional options, the preferred magnitude type can be selected from a drop-down menu and fixed to that type and value. The configured preferred magnitude type will be preselected in the dropdown list.
  This applies also to custom commit buttons when used in combination with SHIFT or if the profile asks for confirmation.

Selection of preferred magnitude



Changes as of SeisComP version 6.5.0 III

trunk:

- Add new filters `SUM(timespan)` (sum of amplitudes within *timespan* preceding the sample), `DT` (replaces each sample with current sample interval), `SR()` (replaces each sample with current sample rate).
- Allow negative frequency values for filters like `BW*()` and `BPENV`(). Negative frequencies resolve to *-freq * sample rate* allowing the specification of filter frequencies depending on sample rate.

amplitudes

- When measuring Ms(BB) amplitudes and IASPEI mode is enabled then the dominant period of the signal must be within the default range of 3 - 60 s or as configured in an Ms(BB) amplitude profile in global bindings.

fdsnxml2inv

- With the new option *–only-instruments* networks are ignored and only instruments are written.
- The stream sampling rate is derived from decimation stages if not given explicitly in the FDSNXML channel.

Changes as of SeisComP version 6.5.0 IV

ql2sc:

- Send EvPrefMw if Mw part of a moment tensor has been received as preferred magnitude. This fixes the *syncPreferred* parameter.

scautoloc:

- Fixed some memory leaks which could previously degrade the performance in case of very many picks, especially fake picks without new origins.

screloc:

- The new configuration parameter `allowAnyStatus` allows relocating origins without checking their evaluationStatus.

scevtlog:

- Comments of picks are also written to XML generated files along with the picks.

Changes as of SeisComP version 6.5.0 V

gempa

scxmldump:

- Support dumping picks by publicID using the new option `--pick`.
- Unpreferred magnitudes are ignored when using the option `-p`.

stdloc:

- The configuration parameter `GridSearch.cellSize` is replaced by `GridSearch.numPoints` for consistency with the actual methodology of the gridseach location method.
- The default location method is now LeastSquares.
- Like in LOCSAT the new configuration parameter `LeastSquares.depthInit` defines the initial source depth for the least squares method unless given by another method such as grid search or from previous origin in scolv.

Changes as of SeisComP version 6.6.0 I

gempa

Release is to be expected. Some features may be moved to version 7.0.0

trunk:

- Add filter DURATION() for measuring the duration between two values given as arguments. Input samples are replaced with duration and set to 0 outside the configured range.

seiscomp-control:

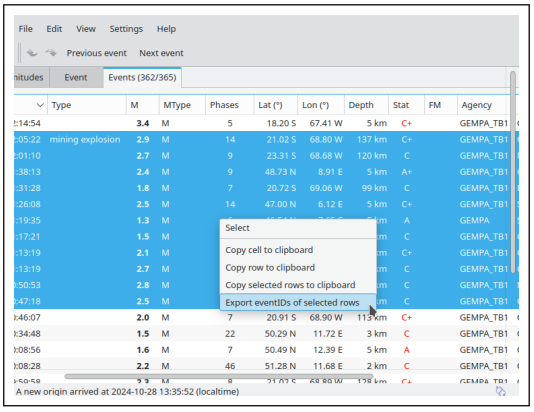
- Always remove run- and pid-file upon seiscomp stop.

Changes as of SeisComP version 6.6.0 II

GUI:

- Event lists support passing the IDs of events in selected rows to an external script which can be configured with the new module configuration parameter `eventlist.scripts.export`.
  This feature allows interactive bulk processing of events by external application, e.g., for generating bulletins or custom plots.

Bulk export from event list



Changes as of SeisComP version 6.6.0 III

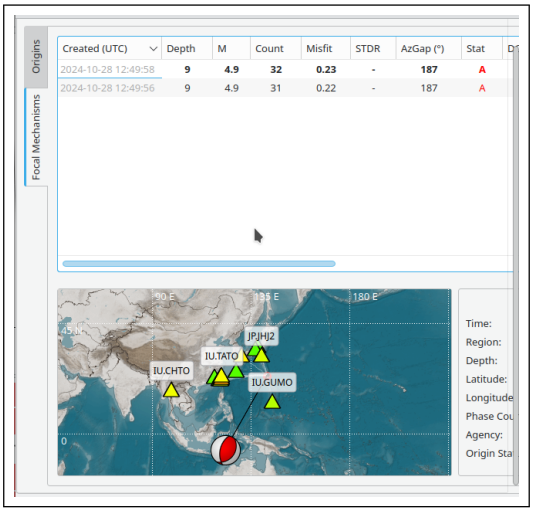
scolv:

- Show the station distribution on the map for focal mechanisms if station display is enabled (F9).
- The operator comment input fields in *Confirm/Commit with additional options* now support linebreaks and have no limit of the number of characters.

scqcv:

- Filter strings previously applied by operators are stored in QSettings where they will be remembered for future application.

View station distribution for focal mechanism



Changes as of SeisComP version 6.6.0 IV

gempa

scrttv:

- The configuration of the module parameter `filters` now supports filter names like in scolv which are displayed in the filter selection menu.
- The sorting of streams w.r.t. location and channel now consistently arranges the streams within channel groups.

fdsnxml2inv:

- A warning is shown when decimation stages of instrument responses are inconsistent.
- The stream sample rate is derived from decimation stages if not given explicitly.

scevent:

- The new plugin "evType" allows setting event types based on comments of picks.
- Read and write journals with the command-line option `--ep`.

Changes as of SeisComP version 6.6.0 V

gempa

scautopick:

- The new module configuration parameters `thresholds.minDuration` and `thresholds.maxDuration` constrain pick generation to the configured time range. The configuration may help to suppress sending unwanted picks of too short or too long signals. If `extraPickComments` is active, the durations are added to the pick objects which can be used for tuning.
- Allow adding custom comments to picks which can be evaluated by other modules, e.g., scevent. The feature requires the module configuration parameters `comment.ID` and `comment.text` to be configured.

scquery:

- Fix *originByAuthor* query in documentation.
- Along with `--showqueries` report if a query does not require any parameter.

screpick:

- Add command-line option `--ep` for XML playbacks.

Changes as of SeisComP version 6.6.0 VI

gempa

scinv:

- In check mode streams without reference to data logger are now reported in order to apply a correction by the user.

iLoc

- Add scripts for installing iLoc auxiliary files with `seiscomp install-deps iloc`.

StdLoc

- Refuse to locating with less than 4 picks.

Changes as of SeisComP version 7.x.x I

gempa

Documentation

- Consider new XML tags `values` and `range` in description of configuration and command-line parameters which will be highlighted in documentation and exposed in scconfig.

trunk:

- Allow creating amplitude aliases by configuration of `amplitudes.aliases` in global module configuration and amplitude type profiles in global bindings.
- When configured, the new amplitude type configuration parameters, `minPeriod` and `maxPeriod` in bindings are checked against the measured signal period of amplitude measurements to skip emitting amplitudes which are outside the allowed period range.
- Support amplitude data conversion without configuration of `enableResponses = true` in global bindings, e.g. when computing amplitudes on acceleration data. This implicitly includes support for amplitude updates for such data.

Changes as of SeisComP version 7.x.x II

gempa

magnitudes:

- MLc:
  - Consider source depth by new configuration parameters `c6` and `H` in parametric magnitude calibration function.
  - Add correction terms `c7` and `c8` for exponential decay.
  - Update documentation with new style.

Index