



CHILEAN NAVY HYDROGRAPHIC AND OCEANOGRAPHIC SERVICE

NATIONAL TSUNAMI WARNING SYSTEM



PATRIOTISM

Honor - Loyalty - Courage - Integrity - Duty



```
// THE ... ED ...  
CONF. ... CONFIG. ... CFG.  
AND COL ... ER.360.CFG  
// KEY BINDINGS  
BIND "A_BUTTON" "+JUMP"  
BIND "B_BUTTON" "+RELOAD"  
BIND "X_BUTTON" "+USE"  
BIND "Y_BUTTON"  
"INVNEXTNONGRENADE"  
BIND "L_SHOULDER" "INVNEXTITEM"  
BIND "R_SHOULDER" "+LOOKSPIN"  
BIND "BACK" "TOGGLESCORES"  
BIND "START" "GAMEUI_ACTIVATE" //  
(START) BUTTON - PAUSE
```



National Tsunami Warning System

System Activation/Timing

TRIPARTITE PROTOCOL



SENAPRED

NATIONAL DISASTER
PREVENTION AND
RESPONSE SYSTEM



CSN

NATIONAL
SEISMOLOGICAL
CENTER

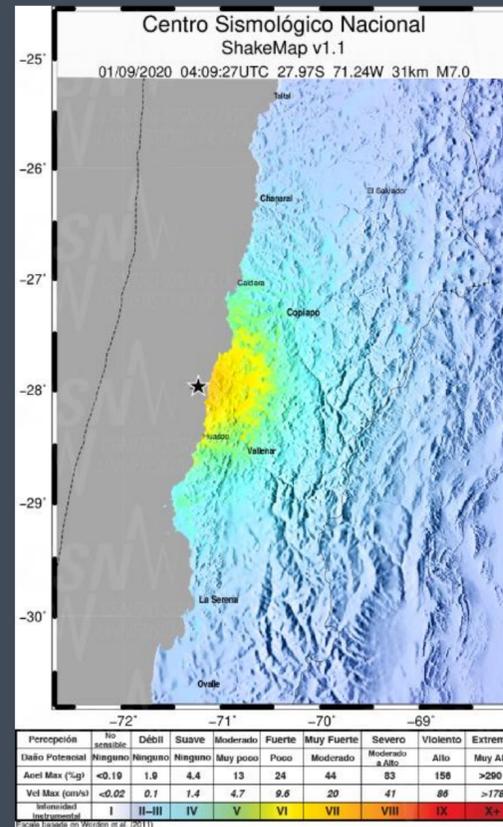


SHOA

CHILEAN NAVY
HYDROGRAPHIC AND
OCEANOGRAPHIC SERVICE



Perception
Report



2 Coastal intensities equal to or greater than VII or one equal to or greater than VIII

Preventive Evacuation

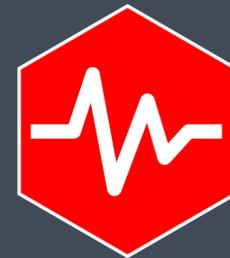
Intensity = Mercalli = Subjective

The population is evacuated while the event is being analyzed.



5 min

PRELIMINARY
BULLETIN



Determination of earthquake parameters:
Epicenter - Depth - Magnitude

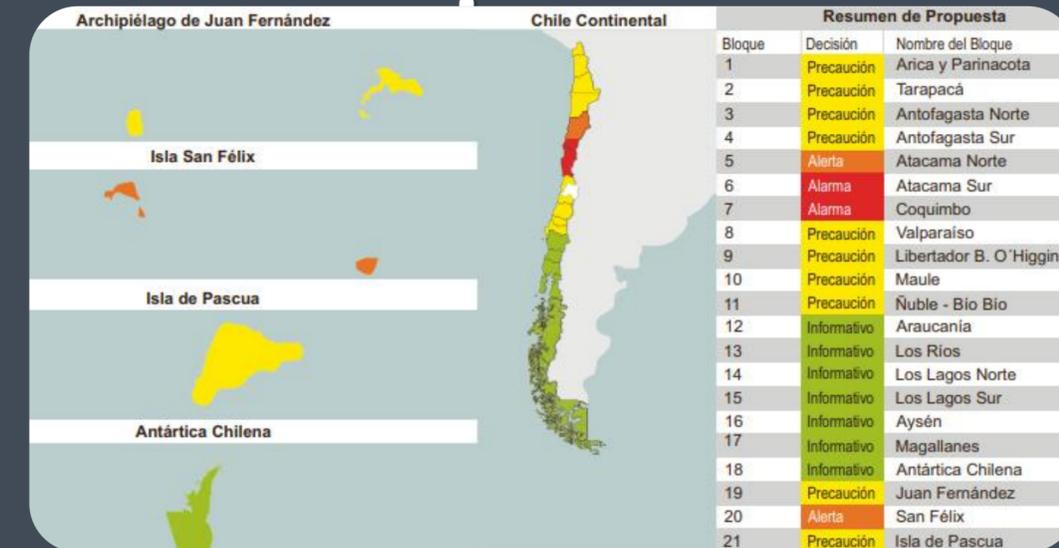
Magnitude = Objective

Analysts determine the characteristics of the earthquake.

It has 200 stations of its own, in addition to the stations in Peru, Bolivia, Brazil and Argentina.



5



INFORMATIVE WATCH ADVISORY WARNING

The preventive evacuation is maintained or cancelled according to the SHOA assessment.



NEAR FIELD



International cooperation



Southeast Pacific Regional Cooperation



National Monitoring Network



National Disaster Management Office



Maritime Authority



Navy

FAR FIELD



International cooperation



Southeast Pacific Regional Cooperation



National Monitoring Network



National Disaster Management Office



Maritime Authority



Navy

International Monitoring Network



SHOA

SIPAT

Technology platform for Tsunami hazard forecast based on numerical modeling (pre-modeled scenarios).

Given a seismic event, it allows to obtain a quick and sectorized forecast (21 blocks) of the different threat levels for Chile.

CHILE DIVIDED IN

21

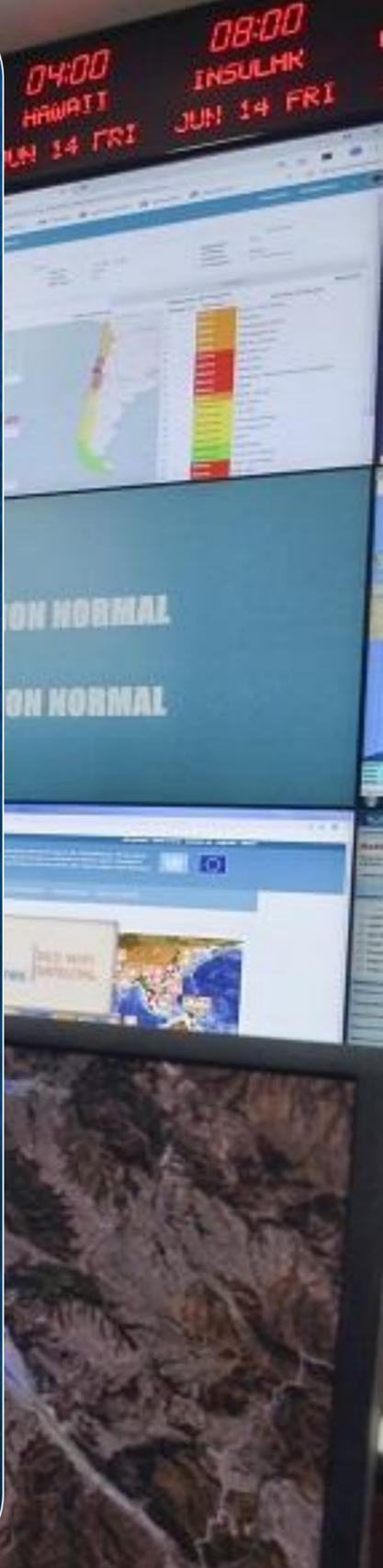
 Blocks

According to Tsunami propagation and political division of Chile.

-  ALARM
-  ADVISORY
-  WATCH
-  INFORMATIVE



IMPLEMENTATION
PHASE-W
THREAT ASSESSMENT
CONTINUOS UPDATE OF SEISMIC
INFORMATION FOR NEAR-FIELD



Implementation of new DSS/SIPAT version in SNAM

The new version of the SSD includes improvements in the accuracy of the evaluation, which consists of performing an interpolation process in the values of predicted amplitudes. In addition, the evaluation of earthquakes for the coast of Chile is extended to the regional area by means of pre-modeled events.

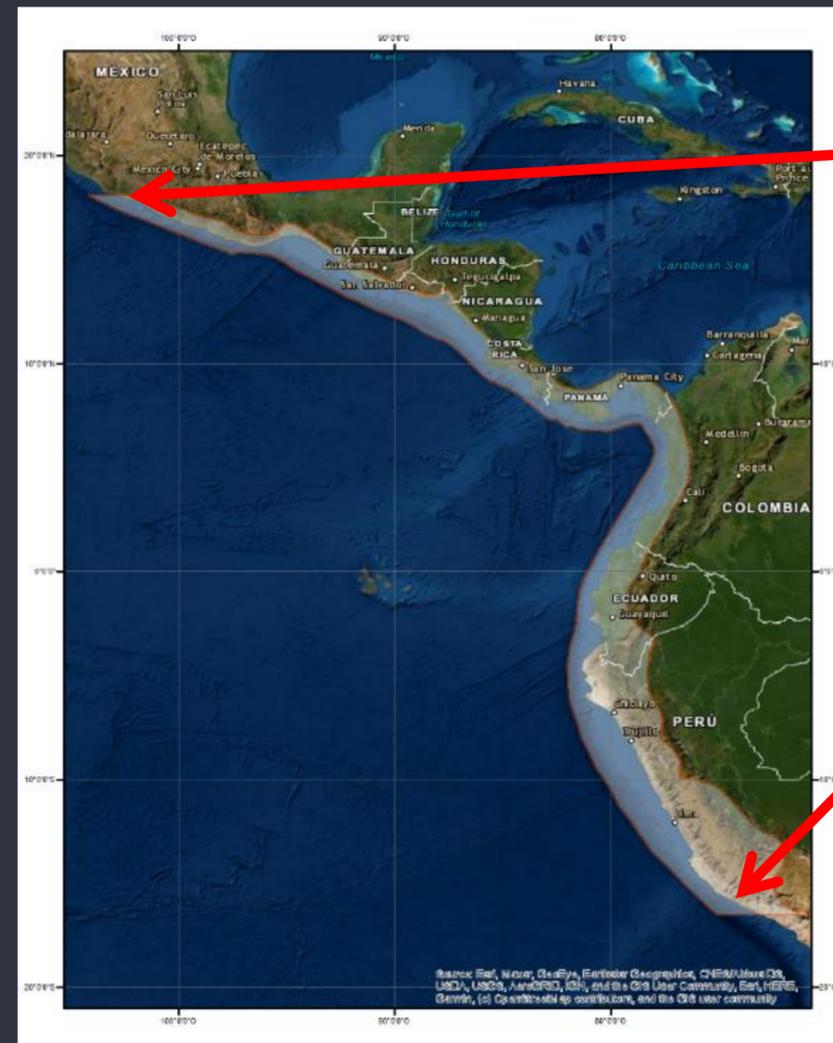
Interpolation

The evaluation of an event of intermediate magnitude, for example 7.3, will be carried out by interpolating the maximum amplitudes generated from the pre-modeled scenarios involved in the lower and upper limit.



This improvement applies to the Near Field within the Tsunamigenic Zone as well as to the Regional area.

Regional Area



Tsunami generation zone that could potentially affect the coasts of Chile. This area extends from southern Mexico to Peru, taking into consideration the tectonic convergence zones.

National Monitoring Network

DART BUOYS – SEA LEVEL STATIONS – METOCEAN BUOYS



2

DART 2G

- Iquique
- Caldera



3

DART 4G

- Mejillones
- Pichidangui
- Constitución



4

WATCHKEEPER

- Iquique
- Antofagasta
- Concón
- Punta Arenas



3

TRIAXYS

- San Antonio
- Talcahuano
- Desertores



49

SLS

Isla de Pascua

LEYENDA:

Red Nacional de Monitoreo de Nivel del Mar

- Estaciones de Nivel del Mar
- Estación de Monitoreo en Lagos
- Boya DART II
- Boya DART 4G
- Boya Triaxys
- Boya Watchkeeper
- Límites Administrativos

Escala: 1:27.000.000

250 125 0 250 500

Millas Náuticas

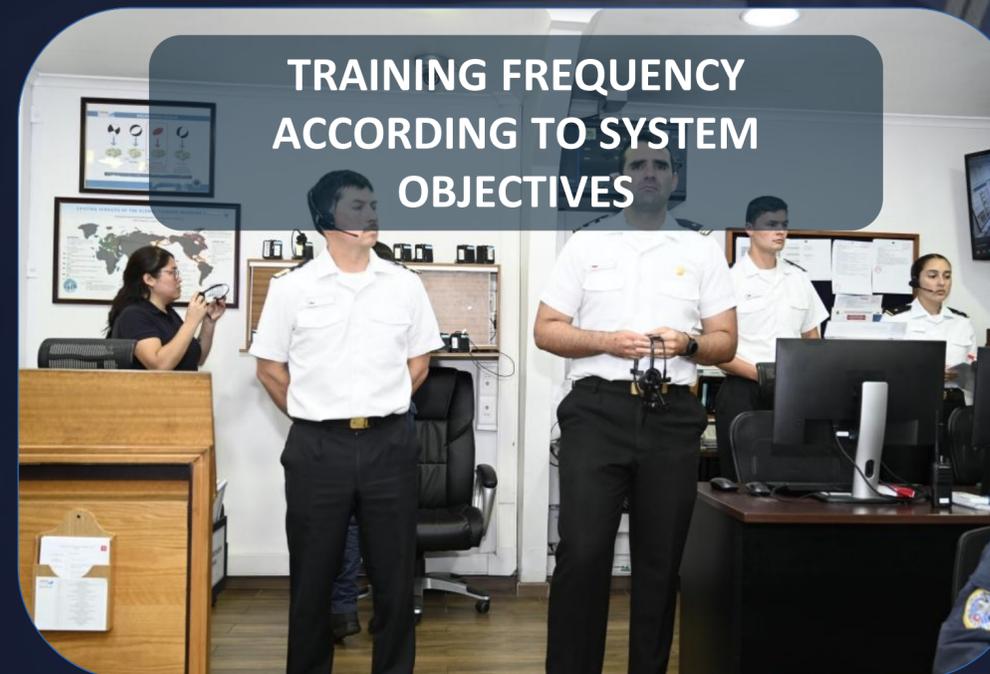
Sistema de Coordenadas: GCS WGS 84



TRAINING AND PREPAREDNESS

Chile's NTWC has developed a training scheme based on four levels associated with the degree of involvement: on-duty personnel (daily), institutional (monthly), inter-institutional at the national level (triannual), and regional (biannual).

Each of these levels has a different focus and specific objectives. Also, the training team complements scripts with real-time simulators for seismic data and mareographs.



TRAINING AND PREPAREDNESS



ITP 2024

Between August 19th and 30th, the Chilean Navy Hydrographic and Oceanographic Service (SHOA) and the International Tsunami Information Centre (ITIC), hosted in Valparaíso Chile, a new version of the TIC Training Programme on Tsunami Early Warning Systems and the PTWC Enhanced Products, Tsunami Evacuation Planning and Tsunami Ready Programme (ITP-TEWS 2024)

This event gathered 31 participants from 19 different countries, including island countries from the Pacific and the Caribbean, to learn about the latest developments on Earthquake detection and evaluation, Tsunami Threat Assessment and monitoring as well as Emergency Preparedness and Mitigation.



Future Implementation of new siren system

A tender was made for sirens for the coastal edge for the whole country.

The creation of the Tsunami Alarm System seeks to implement a warning procedure, notification of possible risks and tsunami evacuation processes, through the installation of 1,049 sirens.

This will allow SENAPRED to alert the population located in risk areas in case of a possible tsunami. The sirens will be equipped with cameras and weather stations, as well as a redundant communication system and control centers at regional and central level.

The project comes to enrich the network that already exists in our country, such as the Emergency Alert System (SAE), the ABC System of ambulances, firefighters and police; and the role of the different national institutions in charge of processing information and defining the characteristics of the eventual tsunami.



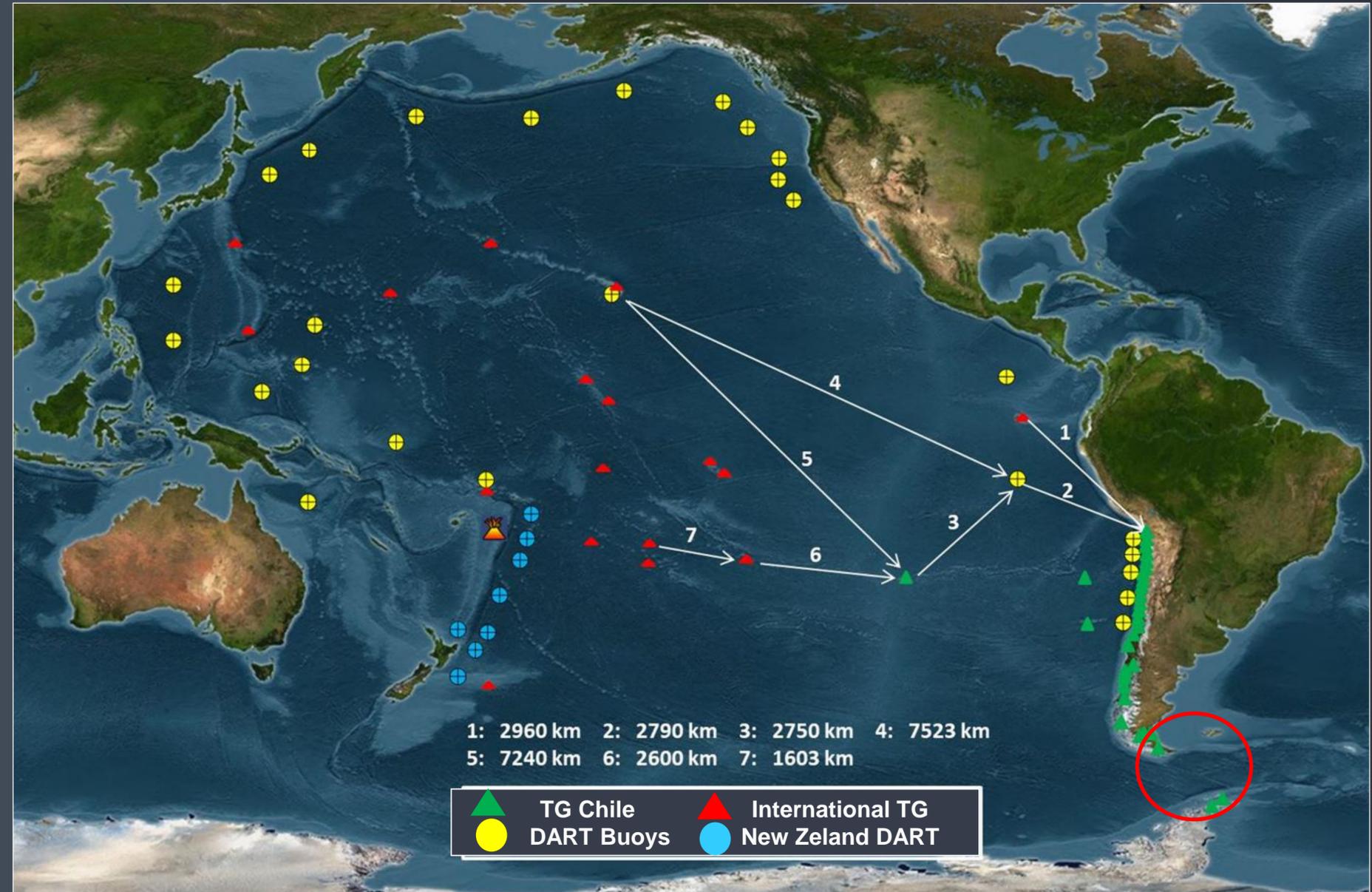
reference image



Pacific Basin Overview

DART BUOYS – TIDE GAUGE (TG)

- Due to its large size, impossibility of installing seismological instruments in the entire Pacific Basin.
- Areas where there is no information on tsunami behavior. This could be observed in the tsunami produced by HTHH on 2022.
- The Antarctic zone is not well instrumented neither with seismological instruments (> 10 min reception of information) nor with oceanic measurement instruments.



National Data Buoy Center (NOAA)
(<https://www.ndbc.noaa.gov/>)

Submarine Cable CHILE

- The Chilean Government is evaluating the possibility of deploying a cable to Antarctica (approx. 1,200 km), for which it is necessary to carry out a Study (*) of the technical, legal, economic, financial and geopolitical feasibility of the project.
- The Salience - Pioneer Consortium has been awarded the contract to carry out the Feasibility Study of the Project (announcement published by the Undersecretariat of Telecommunications on January 8, 2025).
- Feasibility study (Capacity and projection for 20 years), including: “design criteria, installation and operation of sensors or devices that make it possible to use the submarine cable system for monitoring the weather, disaster alarms or any other physical variable of scientific interest (SMART Cables) ”.



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