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Italiadomani
PIANO NAZIONALE
DI RIPRESA E RESILIENZA



terabit

Use Case SHAKE: aggiornamento e prossime attività

Elisa Zuccolo, Chiara Scaini, Giorgio Bolzon, Vittorio Sciortino, Fabio Pitari, Lucia Rodriguez Muñoz, Ileana Elizabeth Monsalvo, Valerio Poggi

Lucia Rodriguez Muñoz

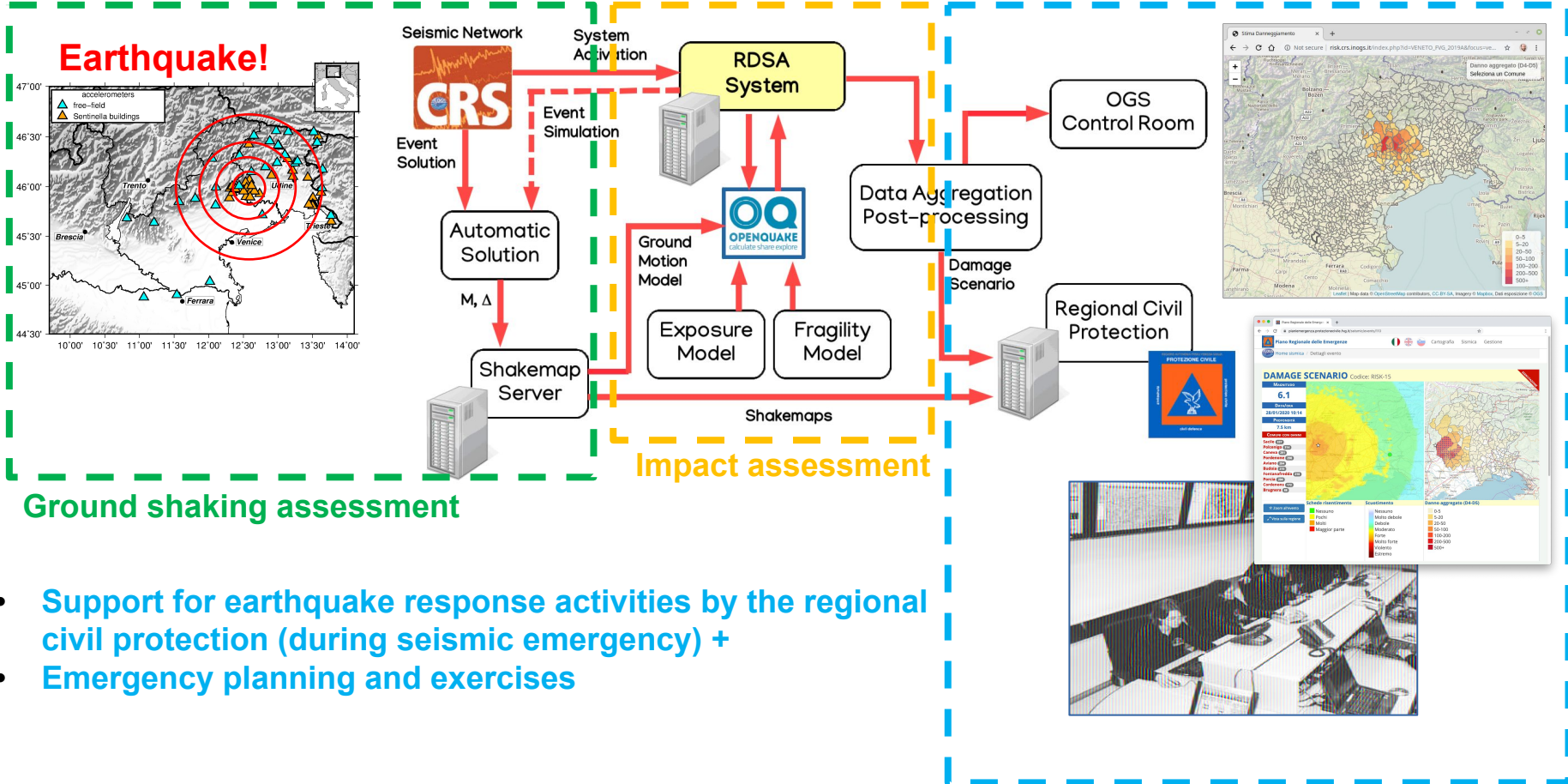
Bari, 25 Febbraio 2025

Conferenza TeRABIT







CINECA

Infrastruttura di allerta di OGS

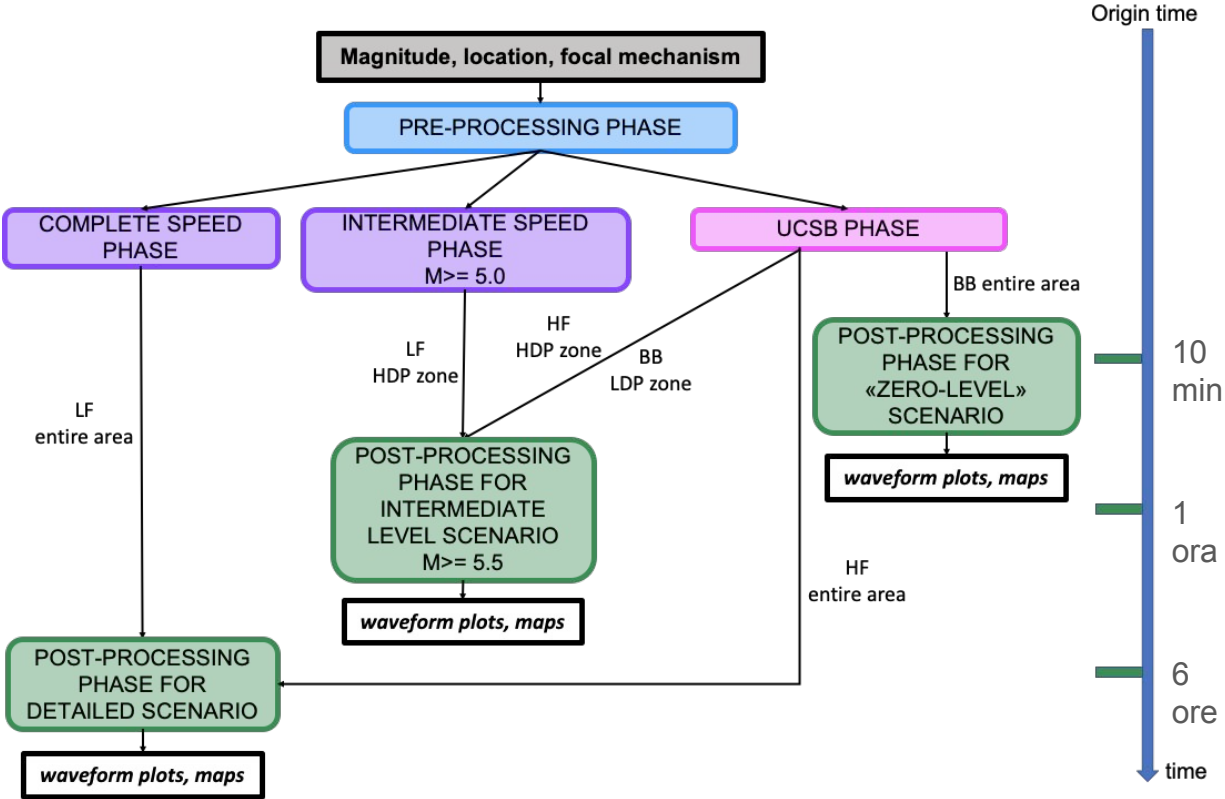
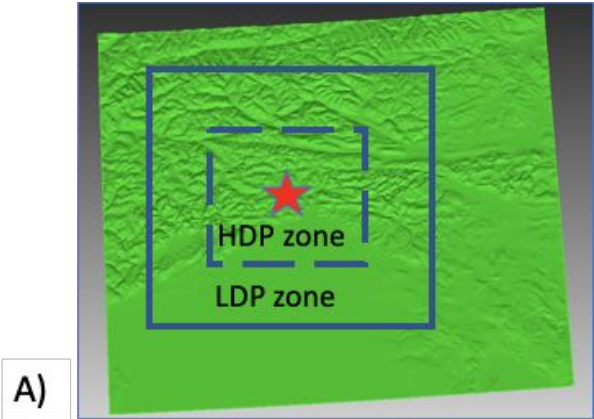


- Support for earthquake response activities by the regional civil protection (during seismic emergency) +
- Emergency planning and exercises

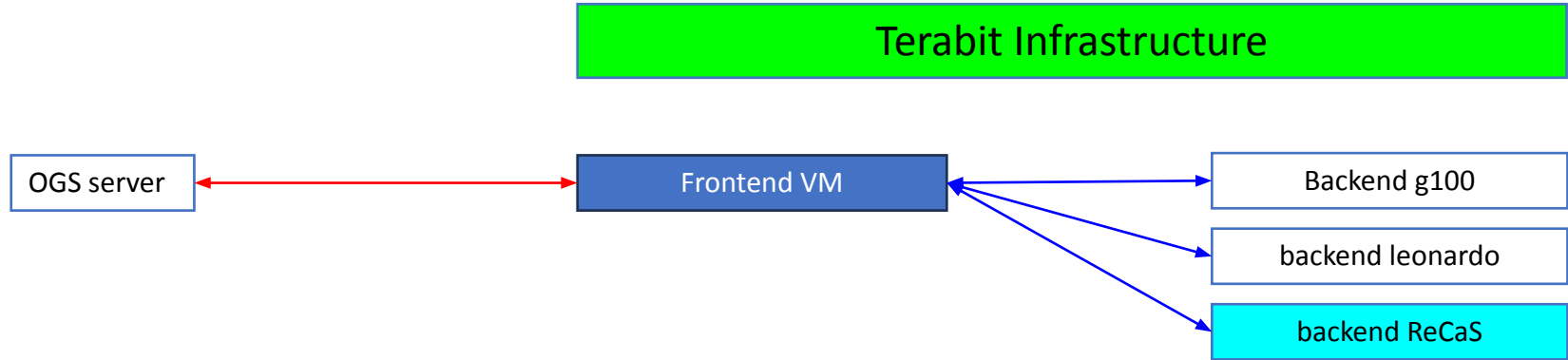
Project timeline (Bologna, 15 Ottobre 2024)

	OTT	NOV	DIC	GEN	FEB	MAR			
Installazione sulle bubbles INFN				✓	(Elisa, Giorgio, Giacinto, Fabio, Lucia)				
Definizione delle risorse in funzione della magnitudo				(Elisa) - RIMANDATO ALLA FINE					
Definizione delle risorse in funzione del backend			✓	(Giorgio, Fabio, Lucia, Elisa, Vittorio)					
Modifica workflow con mesh precalcolate							(Ileana, Elisa)		
Gestione I/O						(Valerio, Giorgio, Fabio, Lucia, Vittorio)			
Paper				(Elisa, Giorgio, Fabio, Lucia, Valerio, Chiara, Stefano)					

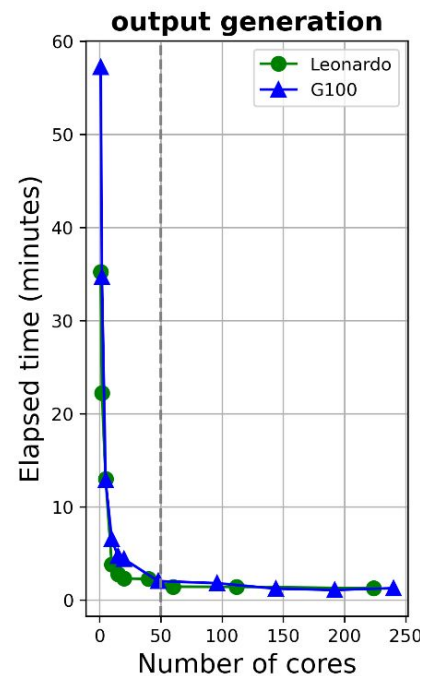
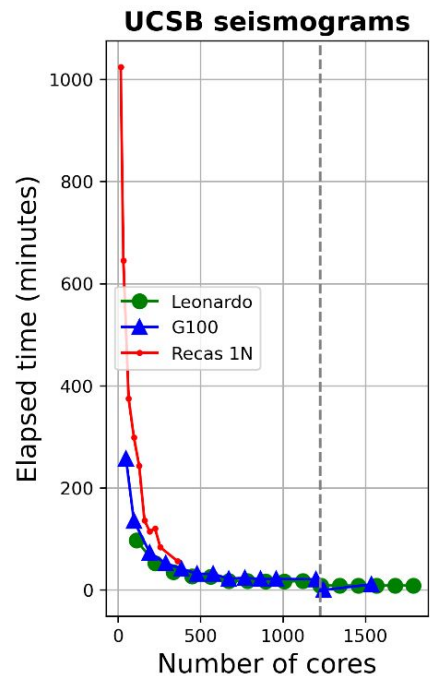
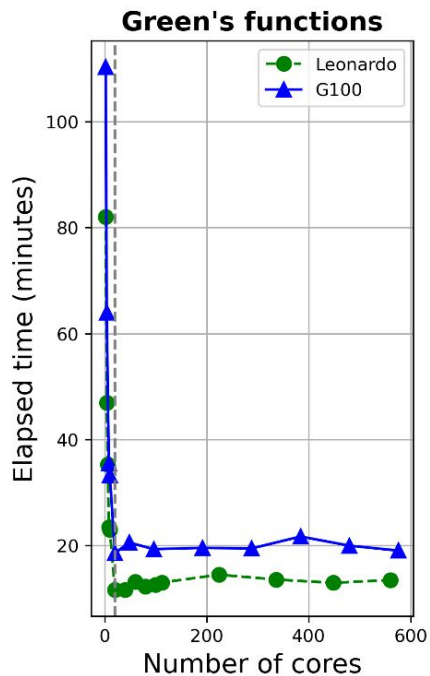
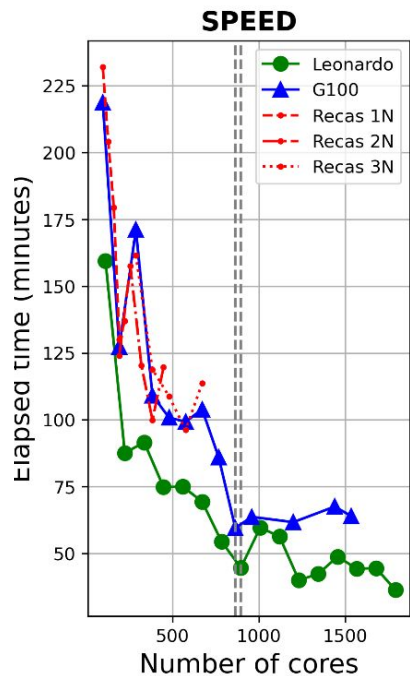
UrgentShake: nuovo workflow



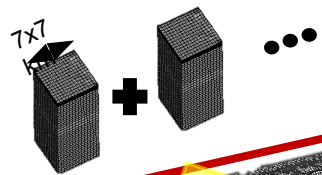
Installazione sulle bubbles INFN



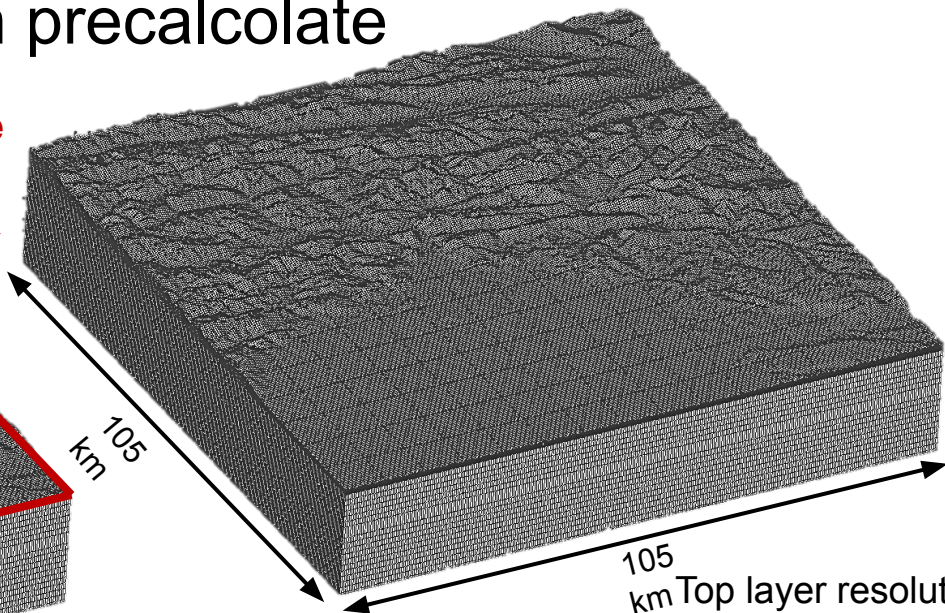
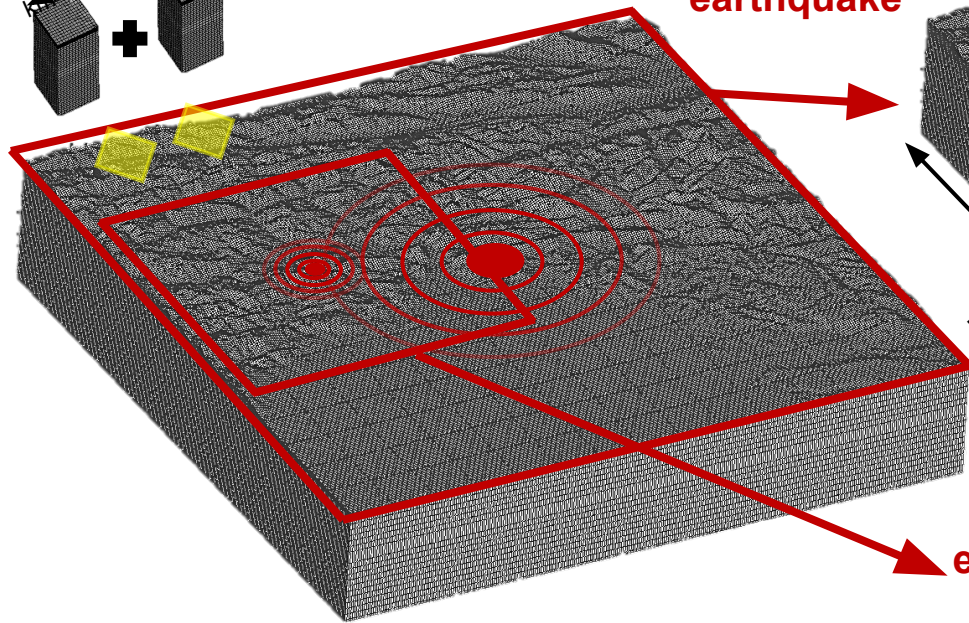
Definizione delle risorse in funzione del backend e test di scalabilità



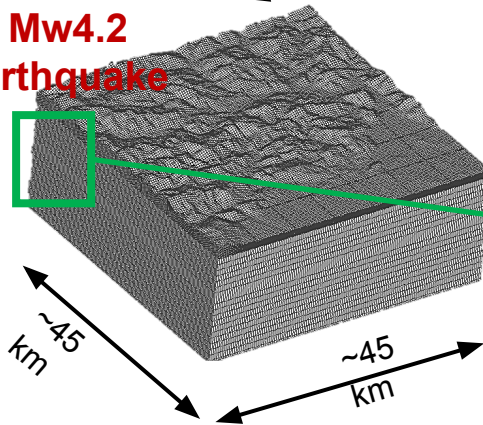
Modifica Workflow con mesh precalcolate



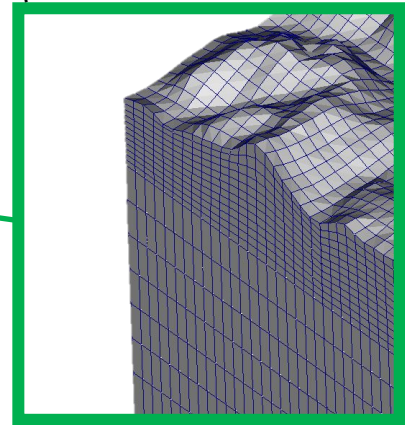
**Mw6.4
earthquake**



**Mw4.2
earthquake**



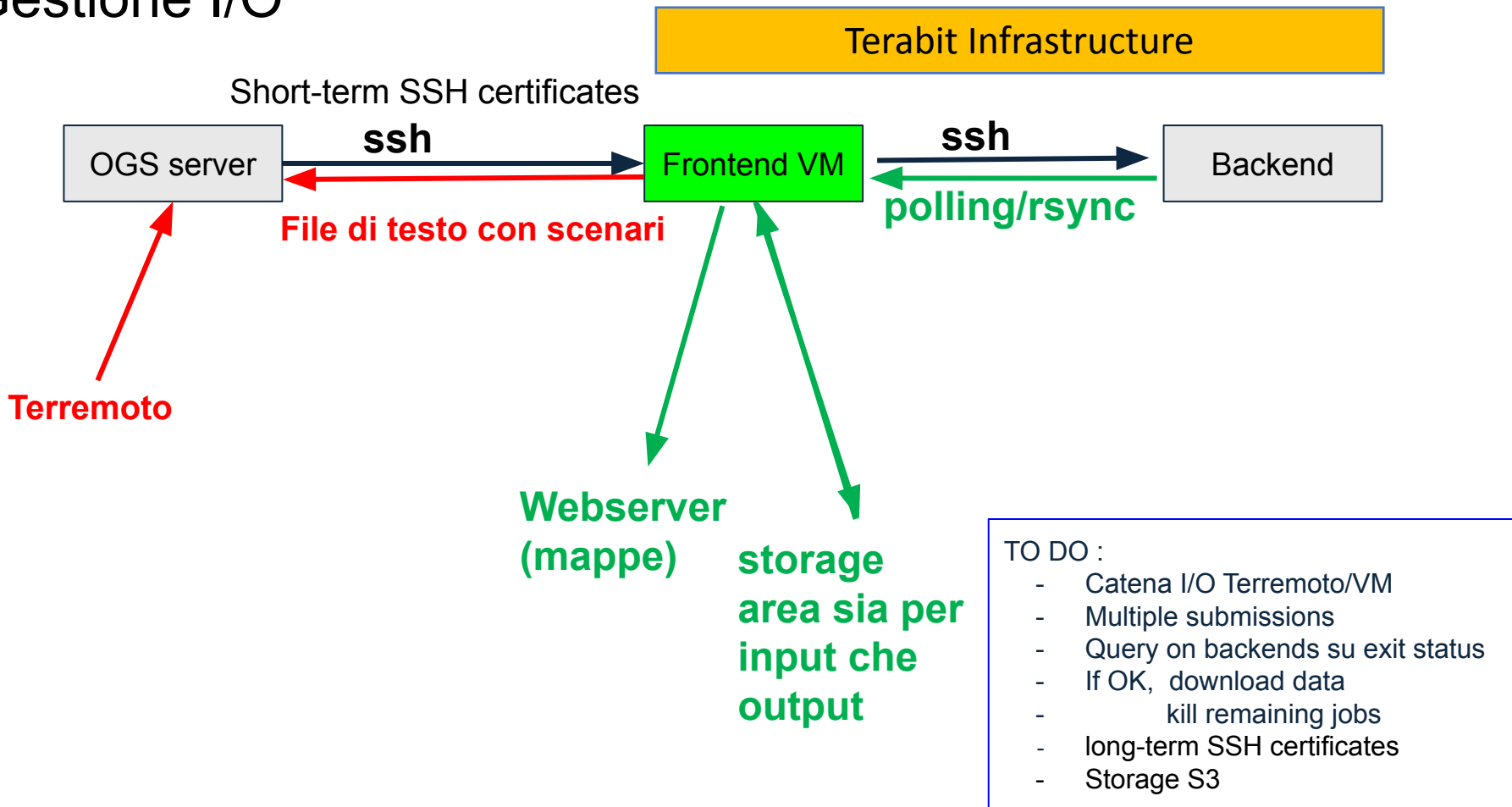
105 km Top layer resolution



Modifica workflow con mesh precalcolate

Model	Merging times (g100)	Number of chunks (7x7 km)	Number of elements
Mw4.2 Topo	2.2 minutes	49	692136
Mw6.4 Topo	10.4 minutes	225	3163086

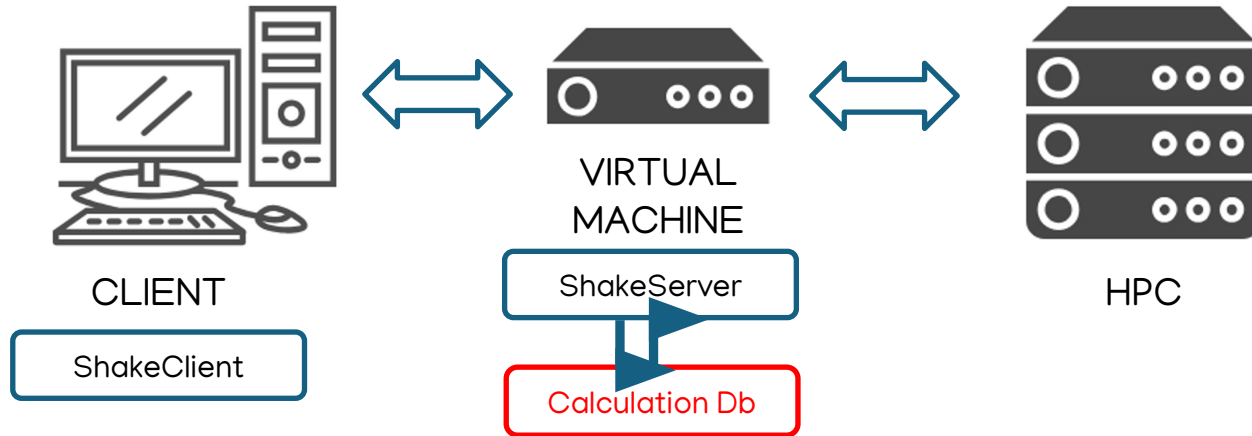
Gestione I/O



Gestione I/O: work in progress

Shakeserver

- **Shakeserver** is a lightweight client-server application designed to manage and organize ground motion simulations performed on the **TeRABIT** infrastructure.
- It allows users to launch new simulations, retrieve stored calculations, and manage the scenario database efficiently.
- The service runs in the background on a **front-end virtual machine**, shielding users from direct interaction with the HPC machines.
- The server accepts action commands from an external client (shakeclient) using TPC sockets.



Paper - in revisione

Seismological Research Letters

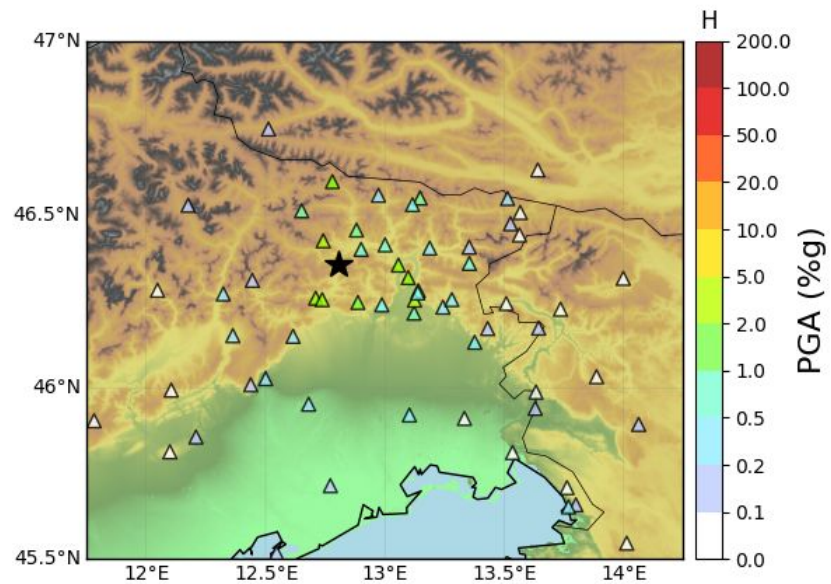
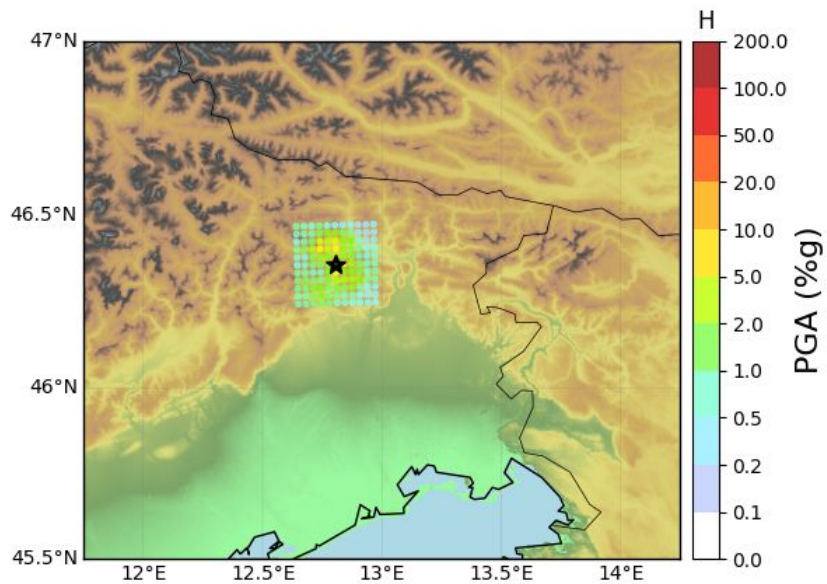
**Towards urgent physics-based ground shaking simulations to enhance
response to seismic emergency in Northeastern Italy**

Elisa Zuccolo¹, Giorgio Bolzon¹, Fabio Pitari², Lucía Rodríguez Muñoz², Chiara Scaini¹,

Manuela Vanini³, Valerio Poggi¹, Stefano Salon¹

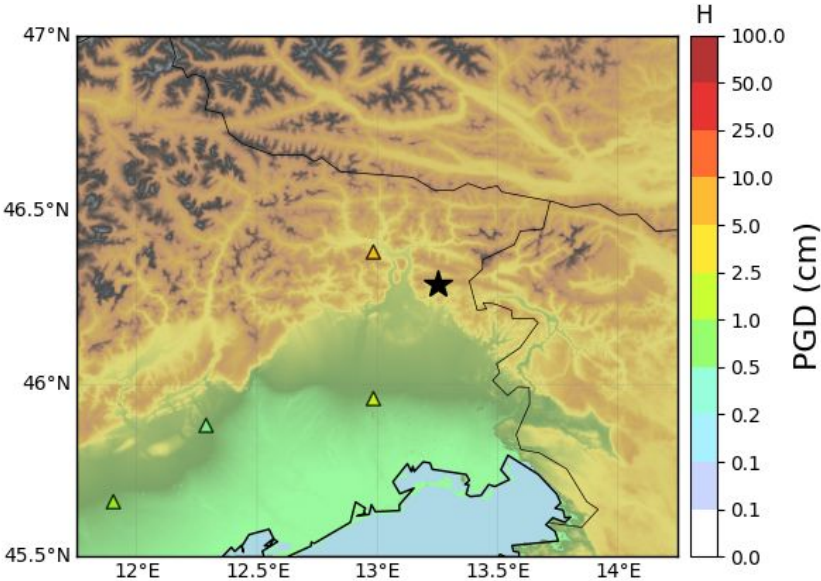
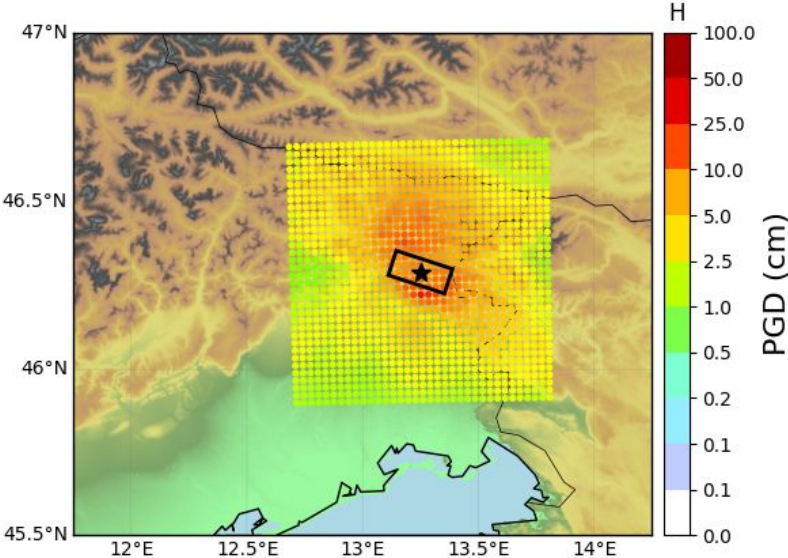
Confronto con le osservazioni

Mw 4.2 - 25x25 km²



Confronto con le osservazioni

Mw 6.4 - 85x85 km²

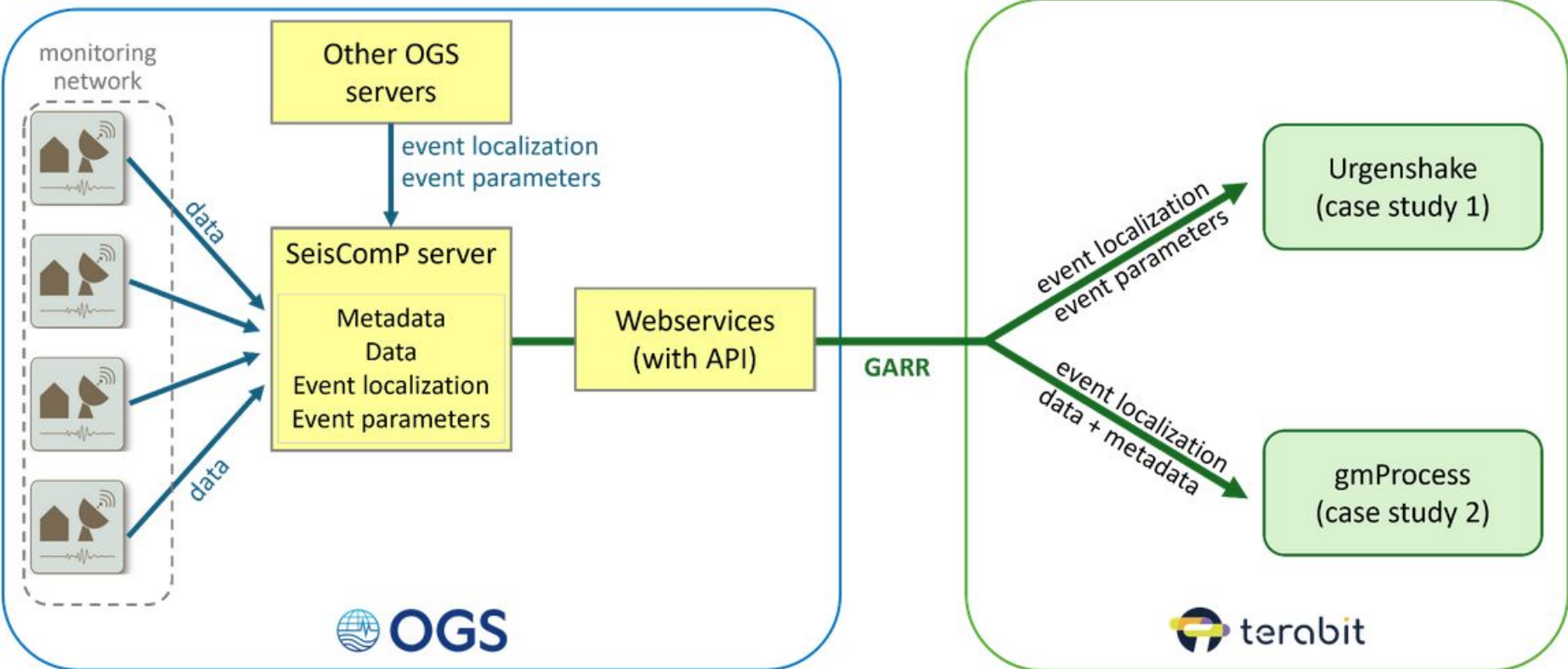


Prossime attività

	MAR	APR	MAG	GIU	LUG	AGO			
Completare i test su ReCaS		(Vittorio)							
Workflow con mesh pre-calcolate			(Elisa, Ileana)						
Completare catena I/O (con ssh e polling) server OGS-VM		(Valerio)							
Prototipo funzionante				(Tutti, S3 + certificati: metà Maggio)					
Paper		(Elisa, Giorgio, Fabio, Lucia, Valerio, Chiara, Stefano)							
Modello 3D con bacino sedimentario							(Elisa, Ileana)		

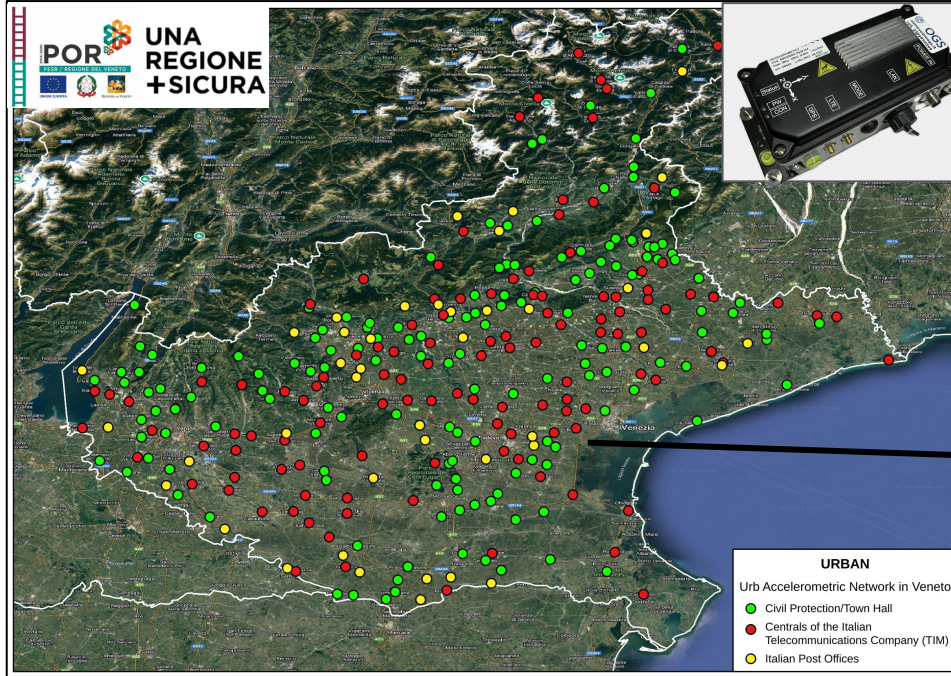
Use case complementare:
preparazione dei dati e implementazione di
GMProcess

SUPPORT TO NUMERICAL SIMULATIONS THROUGH THE TIMELY PROVISION OF SEISMOLOGICAL INPUT DATA



Near real-time processing of OGS network recordings

Obiettivo: valorizzare la rete terabit, in particolare network e HPC bubbles

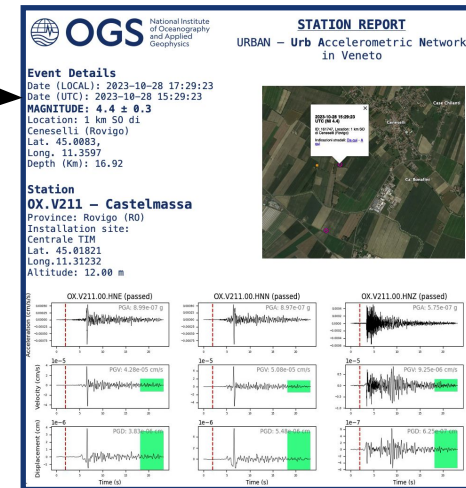


gmProcess open-source software developed by USGS for the automatic processing of ground motion data recorded during an earthquake.

Compute ground motion parameters in near real-time and produce station reports.

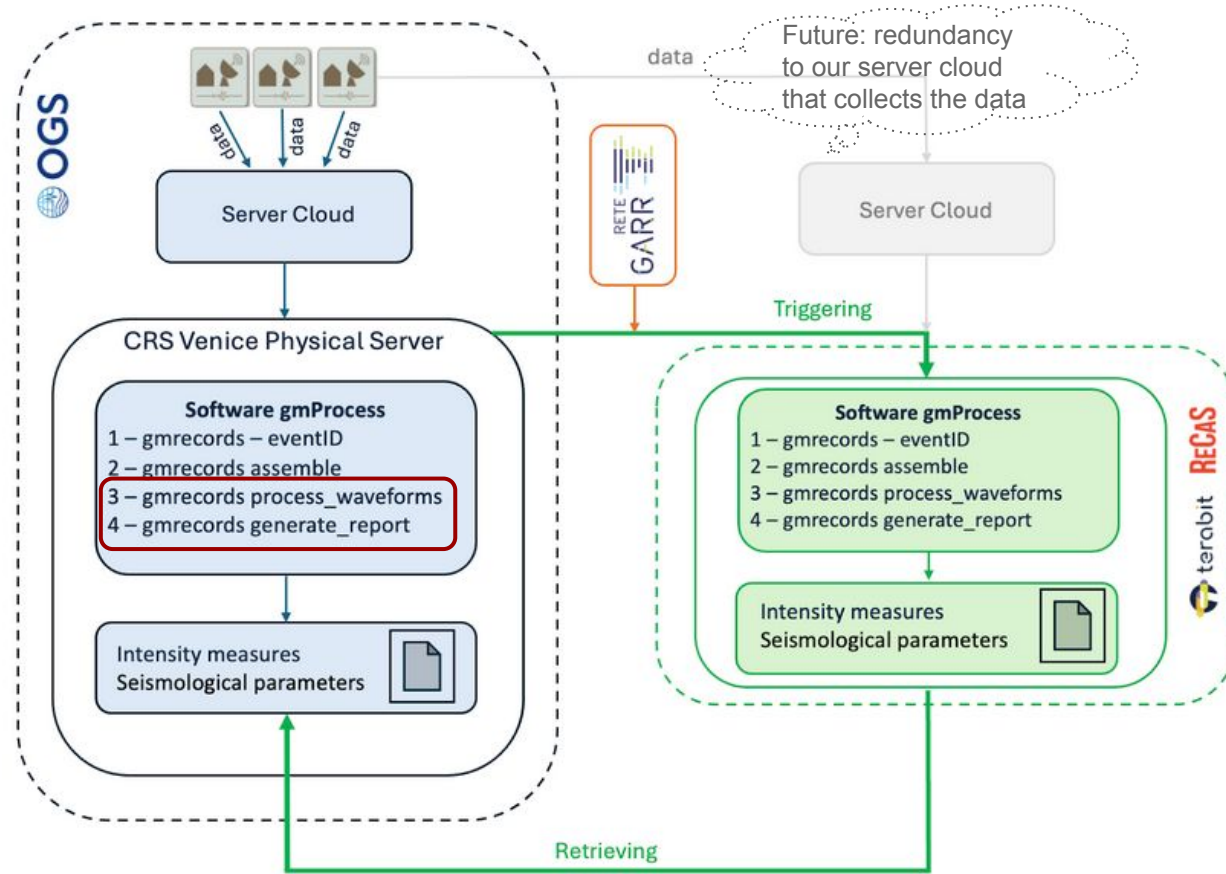
Recordings can be processed independently for each station.

Recordings available for two events: 25 and 28 october 2023 (Mw 4.4 and 4.3) - SW of Rovigo



VenetONE dense seismometric network including 343 accelerometers on 317 buildings. Data are collected and managed by the CRS research infrastructure.

Optimization of code and computational strategy



- 1) Test the different software phases and identify the **bottleneck**

CURRENT ELAPSED TIME UNDER 1 HOUR OF WHICH 40' IN PHASES 3-4.

- 2) Identify the cause:
 - Slow Database (e.g. due to multiple accesses, ...)
 - Slow in writing pdf/png
 - RAM issue
- 3) Replicate the code on Recas and compare performance
- 4) Make branch with proposed code improvements