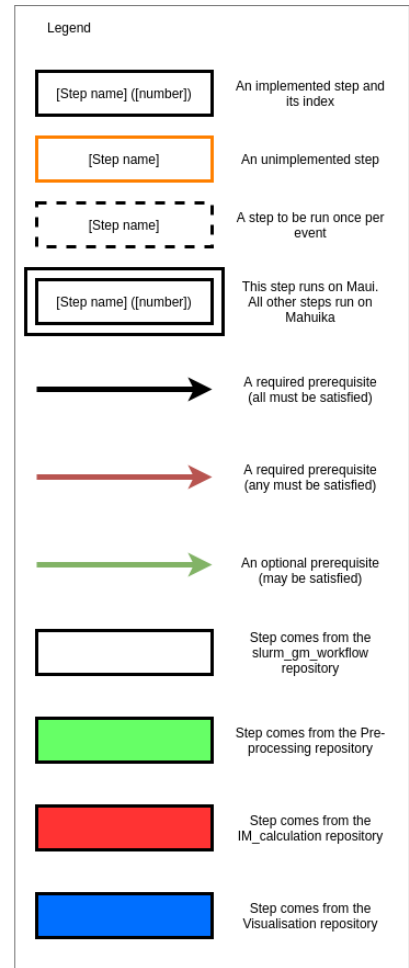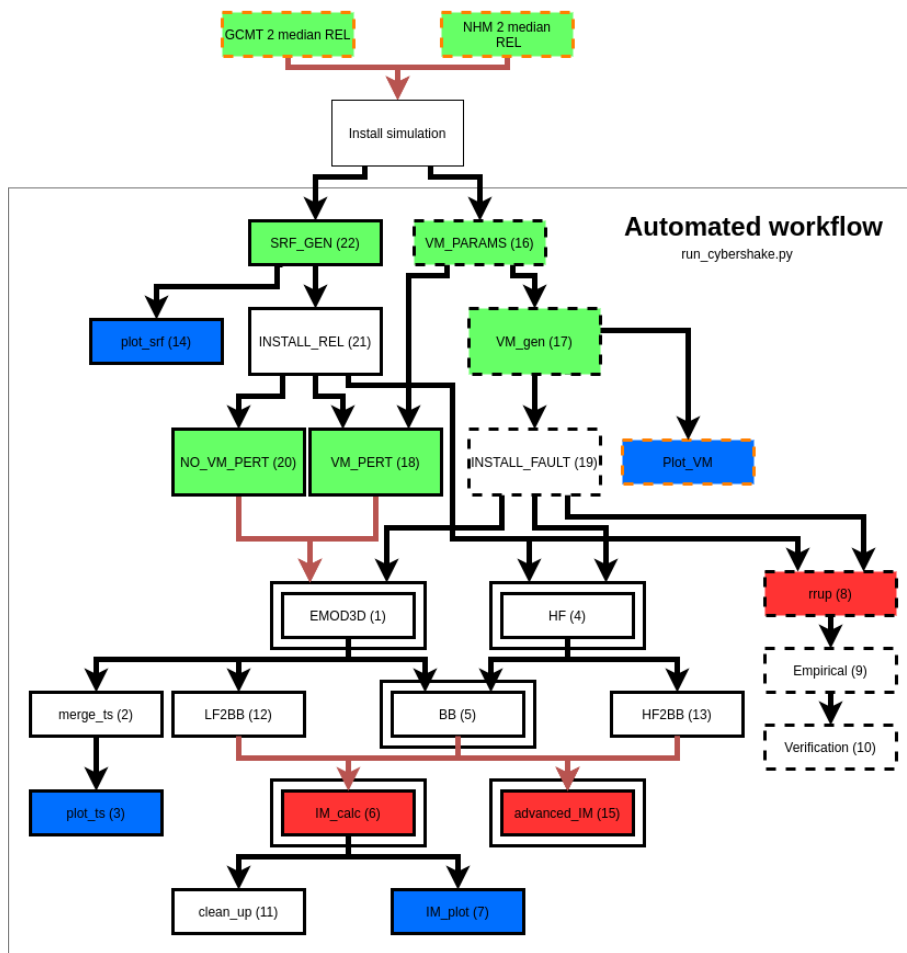# Automated workflow pipelines

The automated workflow currently has the following layout. See below for a legend and summary of step inputs and outputs.

The steps have the following inputs and outputs:

All files after installation can be assumed to require sim/fault/root params as inputs

Index	Step	Inputs	Outputs	Description	Notes
1	EMOD3D	Srf file, VM	EMOD3D seis files, EMOD3D xyts files	Performs the low frequency simulation	
2	merge_ts	EMOD3D xyts files	Merged xyts file	Merges the xyts files from EMOD3D together	
3	plot_ts	Merged xyts file	LF animation	Produces an animation from the merged EMOD3D xyts file	
4	HF	Stoch file, Station ll file	HF binary file	Performs the high frequency "simulation"	
5	BB	EMOD3D seis files, HF binary file	BB binary file	Merges the low frequency and high frequency binaries together into a BroadBand (BB) binary	
6	IM_calc	BB binary	IM calculations csv file	Calculates intensity measures for each station from the BB data	
7	IM_plot	IM calculations csv file	Graphs of IMs	Plots IM values	

8	rrup	Srf file Station ll file	rrup csv file	Calculates station to fault/event distances	
9	Empiric al	rrup csv file empirical config file	Empirical calculations csv file	Computes empirical intensity measures	
10	Verifica tion	Empirical calculations file	?		Currently not fully implemented
11	clean_ up	All non binary/log /IM_calc files	Tar files	Tars all non-final output files together into a single tar file	Intended to reduce the inode usage of completed runs
12	LF2BB	EMOD3D seis files	BB binary file	Converts an LF only run to the BB format	
13	HF2BB	HF binary file	BB binary file	Converts an HF only run to the BB format	
14	plot_srf	Srf file	Plot of srf slip values	Plots the srf slip values	
15	advanc ed_IM	BB binary	OpenSees output files	Runs OpenSees on each station waveform	
16	VM_PA RAMS	Median realisation file	vm_params yaml file	Generates a vm_params file from the median realisation file for an event	
17	VM_G EN	vm_params yaml file	Velocity Model (VM)	Uses the vm_params file to generate an NZVM velocity model	
18	VM_PE RT	vm_params yaml file	Velocity Model Perturbation file (VM) Updates sim_params. yaml to use the perturbations	Generates perturbation files from vm_params data.	Mutually exclusive with NO_VM_PERT
19	Install event /fault	Fault/Event name Velocity model	Fault_params yaml file fd station lists	Generates the fd station lists and fault_params yaml file for a given event/fault	
20	NO_V M_PERT	None	None	Empty step	Mutually exclusive with VM_PERT Makes dependencies easier, as a way of preventing short circuits when running with perturbations.
21	INSTA LL_REL	Sim_params source file	sim_params yaml file	Installs a realisation, creating its runs directory, sim_params yaml file and initial step specific sub-directories (LF, HF, BB)	
22	SRF_G EN	Realisation file	Srf file Stoch file Srfinfo file Sim_params source file	Generates the srf/stoch/srfinfo/sim_params files from a realisation file	