

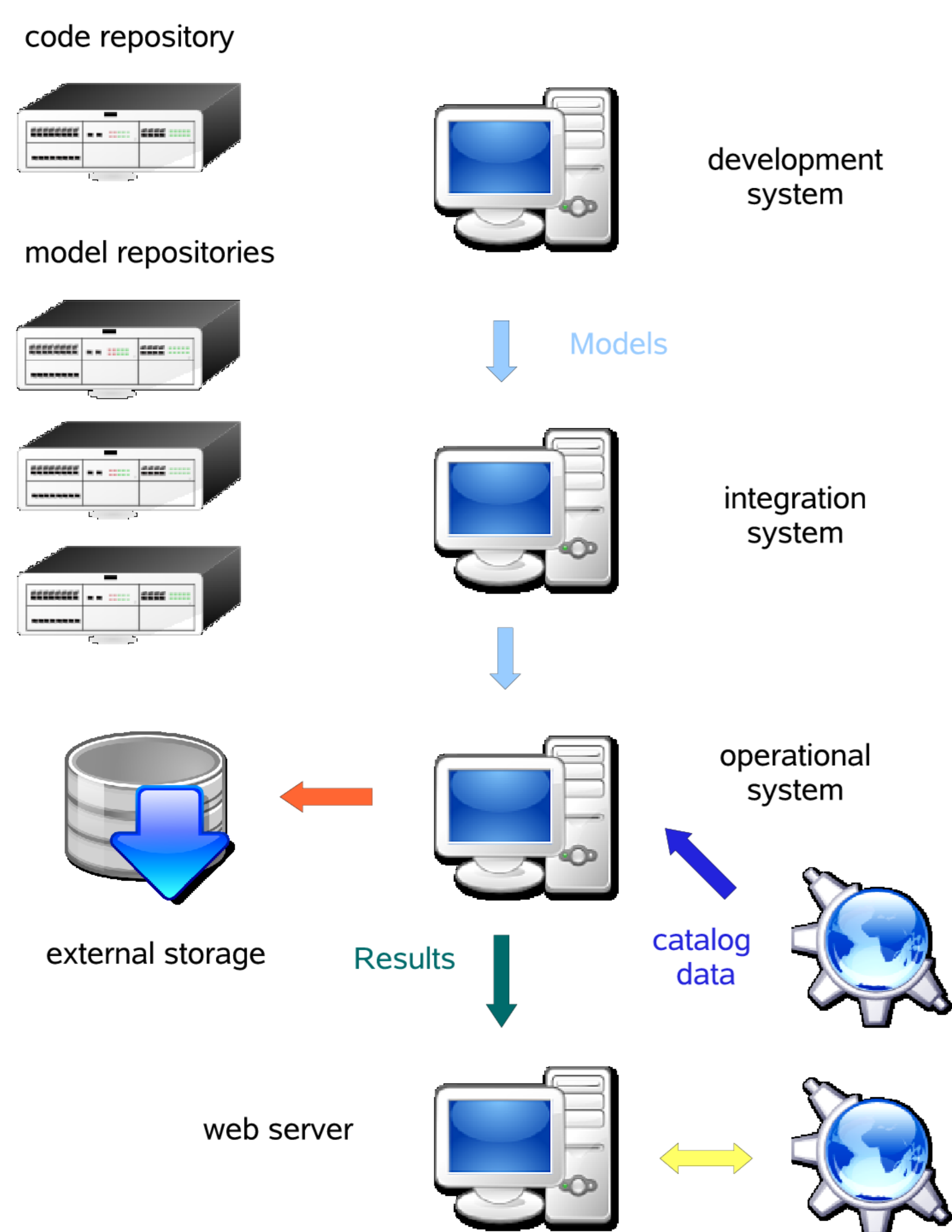
## Objectives

- Establish rigorous procedures for registering and evaluating prediction experiments.
- Construct community standards and protocols for comparative testing of predictions.
- Develop an infrastructure that allows groups of researchers to participate in prediction experiments.
- Provide access to authorized data sets and monitoring products for calibrating and testing prediction algorithms.
- Accommodate experiments involving fault systems in different geographic and tectonic environments.

## Goal

- Reduce the controversy surrounding earthquake prediction through a collaboratory infrastructure to support a wide range of scientific prediction experiments.
- Promote rigorous research on earthquake predictability through the SCEC program and its global partnerships.
- Help the responsible government agencies assess the feasibility of earthquake prediction and the performance of proposed prediction algorithms.

## System Infrastructure



## W. M. Keck Testing Center at SCEC

The initial implementation of the CSEP Testing Center for the California Natural Laboratory became operational on September 1, 2007 at SCEC/USC and is designed to evaluate forecasts stated in terms of seismic rate per latitude/longitude/magnitude bin. The SCEC Testing Center performs prospective forecast testing with a 31-day waiting period for the test date to guarantee integrity of the input catalog data.

### Forecast Models

- 2 one-day models (STEP, ETAS)
- 19 RELM five-year models

### Authorized Data Set

- ANSS Catalog

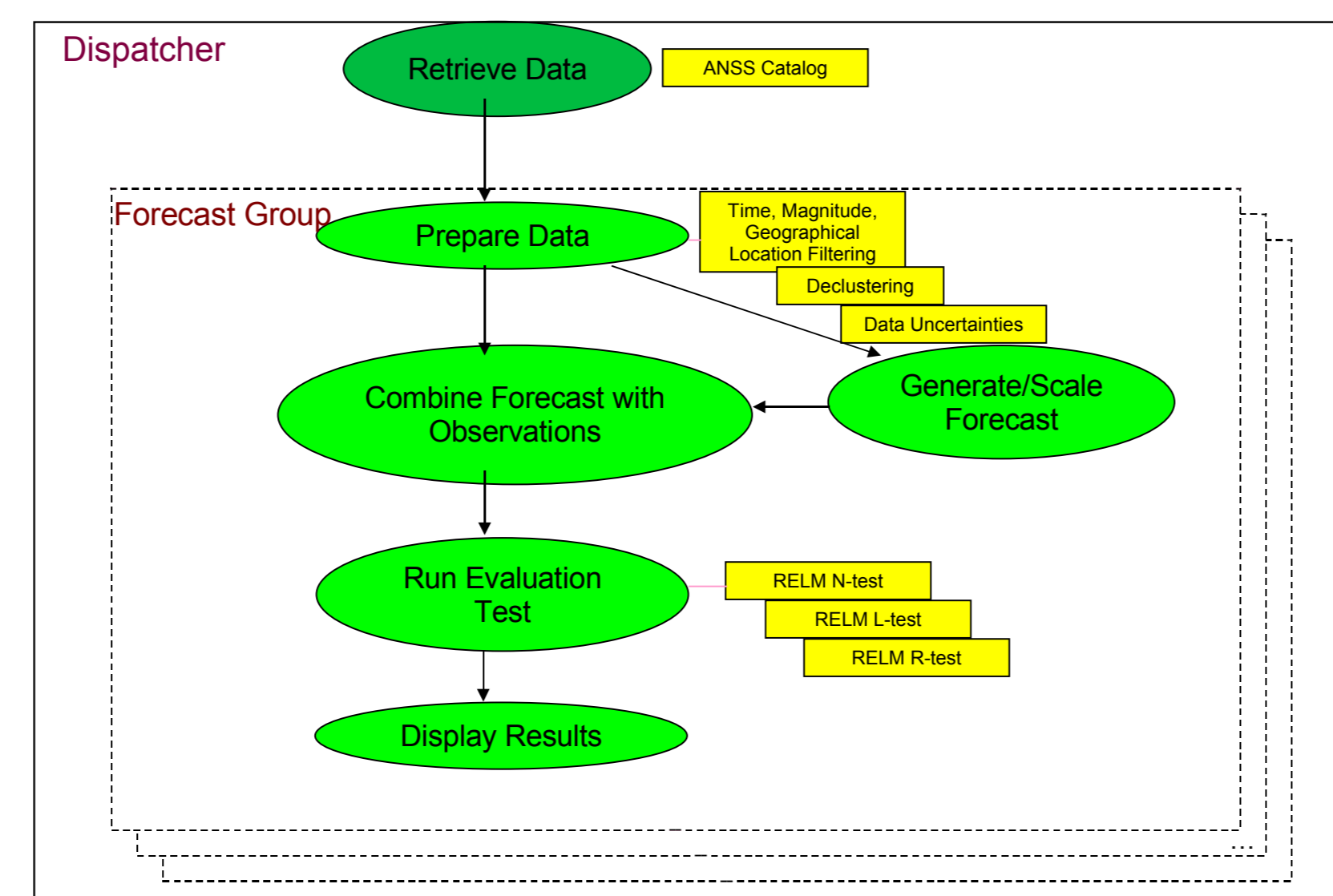
### Evaluation Tests

- RELM N (number of events) test
- RELM L (log-likelihood) test
- RELM R (log-likelihood ratio) test

### Processing Schedule

- One-day models: daily
- Five-year models: monthly

### Automated end-to-end processing



### Full Reproducibility

- The testing center keeps:
- All input data (earthquake catalogs)
  - All simulations (random numbers)
  - All results
  - System and software configurations used for computations (metadata)

## Software Design

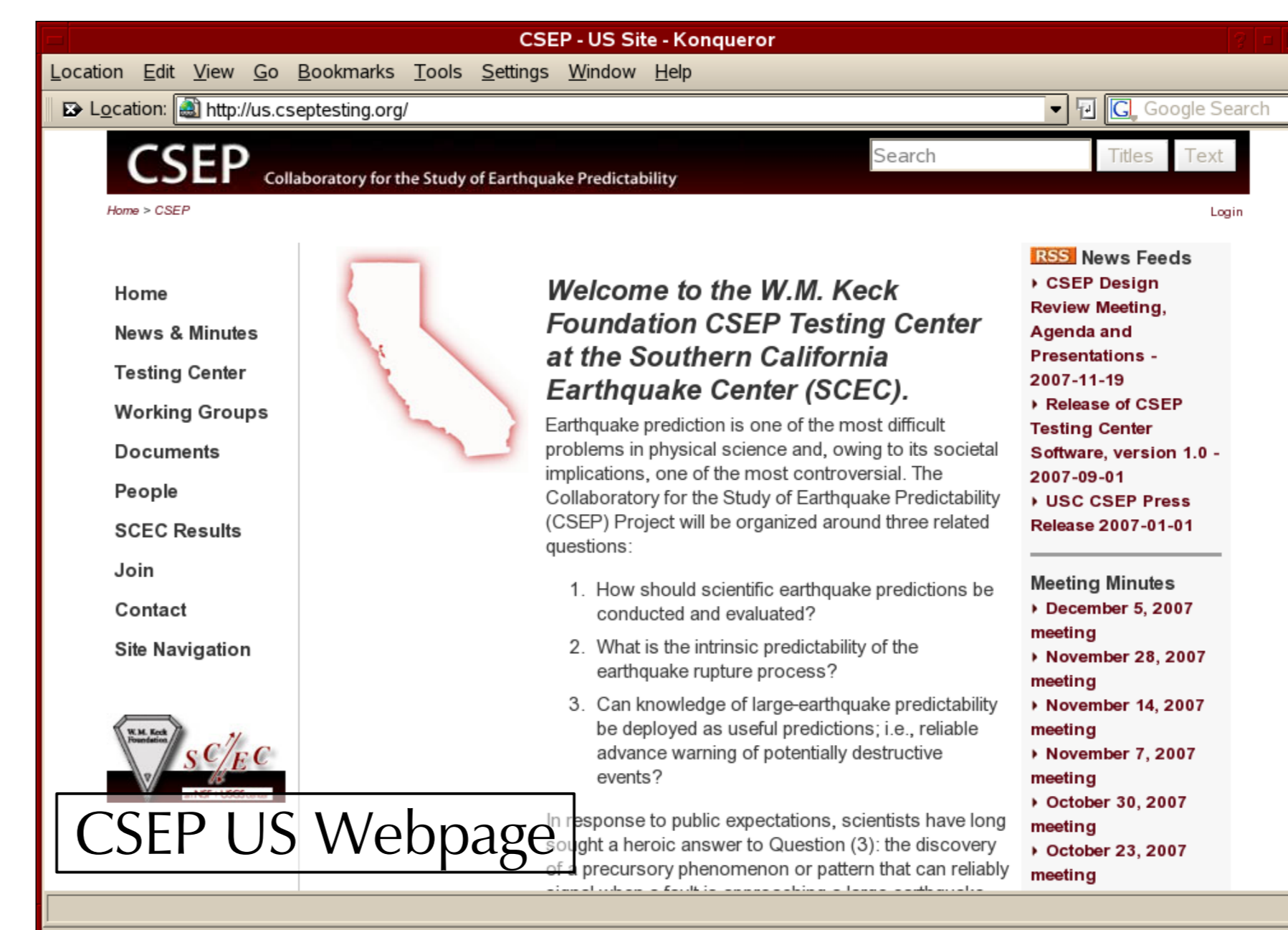
Modular design of the CSEP software meets the requirement of experiment reproducibility; the processing infrastructure allows for automated forecast generation and evaluation within testing centers as well as manual processing for research purposes.

## Software Stack

The CSEP system provides a controlled integration environment with a standardized software stack for developing and installing forecast models:

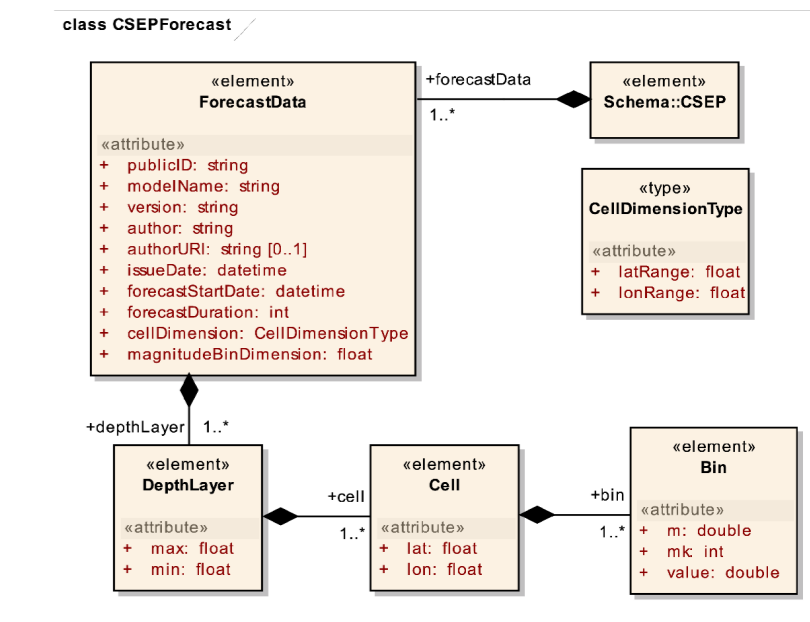
- Linux
- MPICH2
- GCC, G77/gfortran
- Python
- R (Matlab)
- Eclipse [Integrated Development Environment (IDE)]
- Subversion [Source repository]
- CruiseControl [for continuous build process]

## Multiple Web Presentations



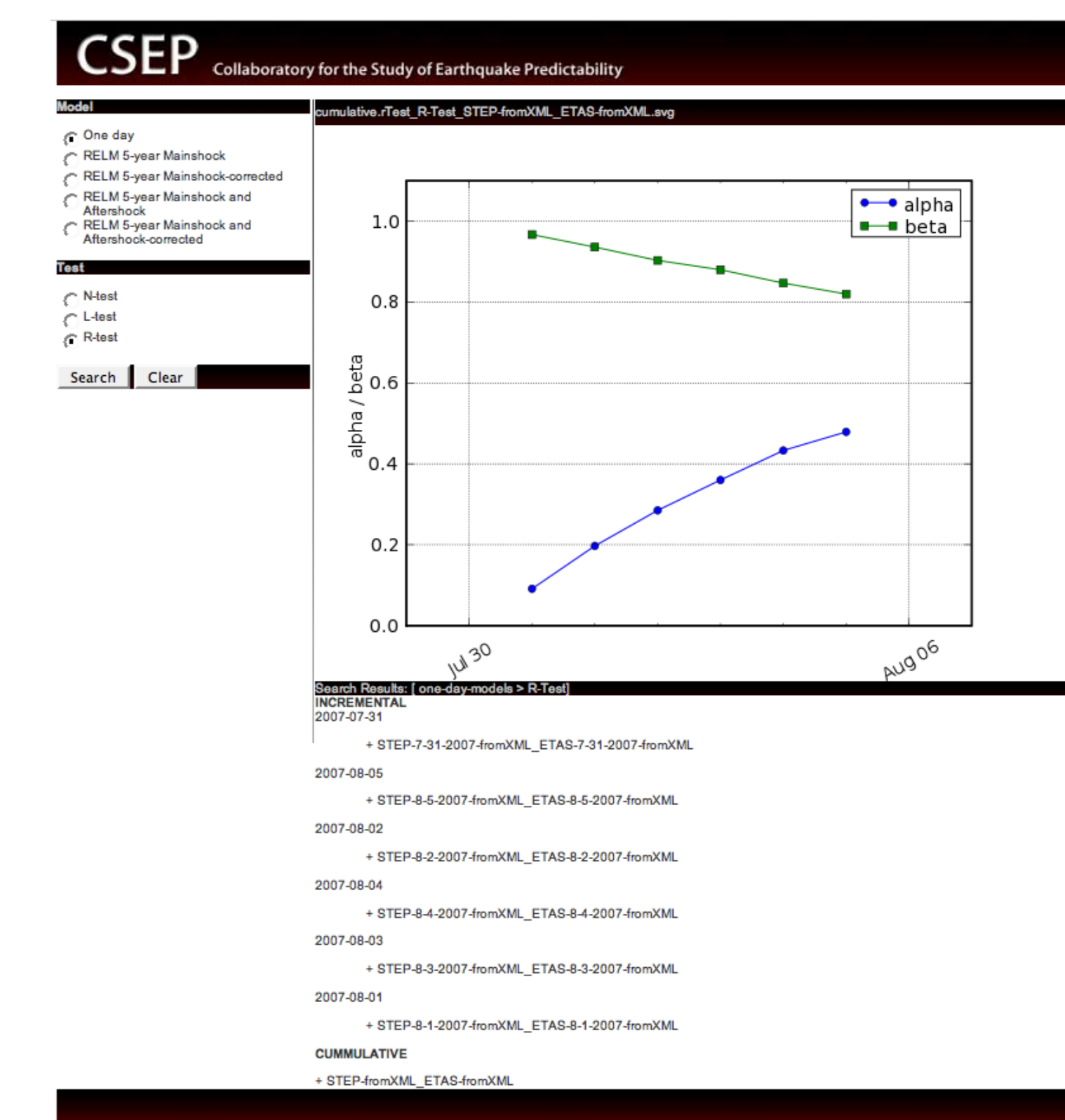
## XML Datatype Definitions

- Earthquake Catalog Format
- QuakeML
- CSEP Formats
- Test Results
- Forecast
- Grid



## SCEC Testing Center Results

Please visit our web page <http://us.cseptesting.org/SceResults> (login name and password are required)



## Development organization

CSEP Software is released under open-source licenses and being validated and distributed to other earthquake forecast testing facilities outside of California. We host the XML-definitions, the software core, and the scripts for Natural Laboratories hosted in our center. We provide unlimited downstream and moderated upstream of codes.

