

# DESIGN & IMPLEMENTATION OF PRE-DISASTER HAZARD LOSS ESTIMATION PLATFORM



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## 1. INTRODUCTION

The platform developed and utilised for this work is the Pre-disaster Hazard Loss Estimation Platform (PHiLEP). The PHiLEP platform is particularly suitable for this specific research purpose since it is devised to facilitate the decision making process in Disaster Risk Reduction (DRR) field by utilising a combination of spatial data management, disaster modelling, optimisation technologies and visualisation. The PHiLEP conceptual model is shown in Figure 1.

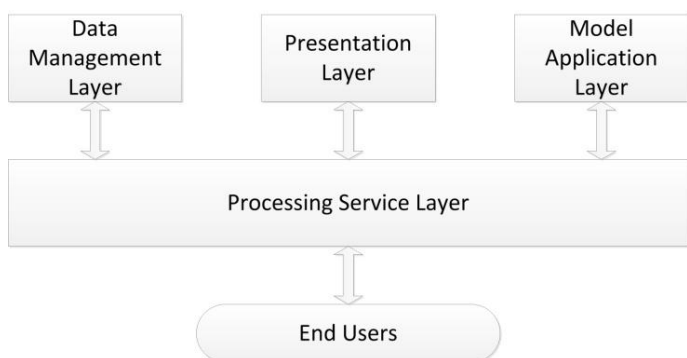


Figure 1: PHiLEP Conceptual Model

## 2. DISASTER RELATED DATA AGGREGATION

One of the key issues in disaster decision making process is to timely extract information from heterogeneous data sources to enhance decision makers' situational awareness. The PHiLEP comes with the capability of aggregating and analysing data

sets from multiple channels such as authority agencies (e.g., ABS, BOM, VicRoads, DEPI), sensor networks (e.g., river meters, pedestrian counters), Volunteered Geographic Information (VGI) platforms (e.g., Ushahidi, Warnwave). The aggregated data then can be populated into the processing chain to develop a series of time-based scenarios to increase the cognitive abilities of decision makers when facing with disasters of large magnitude and uncertainty.

## 3. MULTI-HAZARD MODELLING ARCHITECTURE

The PHiLEP platform has been enabled to plug-in with existing models (such as flood developing models, bushfire propagation models) easily by implementing a universal interface for model integration. The most powerful part of this design is that the DDSS can be loosely coupled with disaster models – they can run as separate applications but still connect to each other via data exchange protocols.

## 4. SYSTEM IMPLEMENTATION

To implement the conceptual model, four major goals need to be achieved: (1) to aggregate heterogeneous data sources conforming OGC standards, (2) to incorporate external disaster models and analysis applications seamlessly, (3) to provide an enriched data visualisation environment and (4) to manage the life cycle of a scenario-based decision making process. A series of open-sourced frameworks have been adopted in the PHiLEP as shown on the left part of Figure 2. Some outputs of flood damage assessment and bushfire risk area analysis (based on imaginary scenarios) are also demonstrated on the right part of Figure 2.



Figure 2: Adopted open-source frameworks in PHiLEP(left); modelling flood damage (right top) and bushfire risk area (right bottom)

