

High-level Design Models for Rich Web-based Applications

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Rich web-based applications (RiWAs) [1], like Facebook or Google apps, provide a higher user experience than regular web applications. They have rich Graphical User Interfaces (GUIs) similar to desktop applications and use an advanced delta-communication model (DC) [2] to communicate faster with the server-side and update the current GUI without loading a new one. The RiWAs development tools, like libraries and frameworks, have evolved over two decades; however, conceptual artefacts like design patterns and design methods/methodologies have not evolved to cater to the RiWAs' specificity [3].

The Unified Modelling Language (UML) is a generic software designing tool; there are UML-based architectural designing languages available like Arc⁴² [4], SAP's TAM [5] and OOA/OOM [6], ArchiMate [7], and SysML [8] [9] [10], where some like C4 model [11] is explicitly focusing on web applications. These available languages do not address modelling all the aspects of RiWAs and exclude features like distribution of the application elements to the tiers and platforms, details of the processing components such as model or controllers, and DC-related processing.

This ongoing research proposes a novel design methodology for RiWAs, including new models, new modelling elements and UML profiles for the new models, and rules and guidelines. For the high-level designing, two new models are proposed; the first is named the level-1 application model, which shows different types of applications – for example, client mobile/browser apps and server-side services – artefacts like databases, their distribution in different tiers and platforms, and their configuration. Figure 1 shows a sample application diagram.

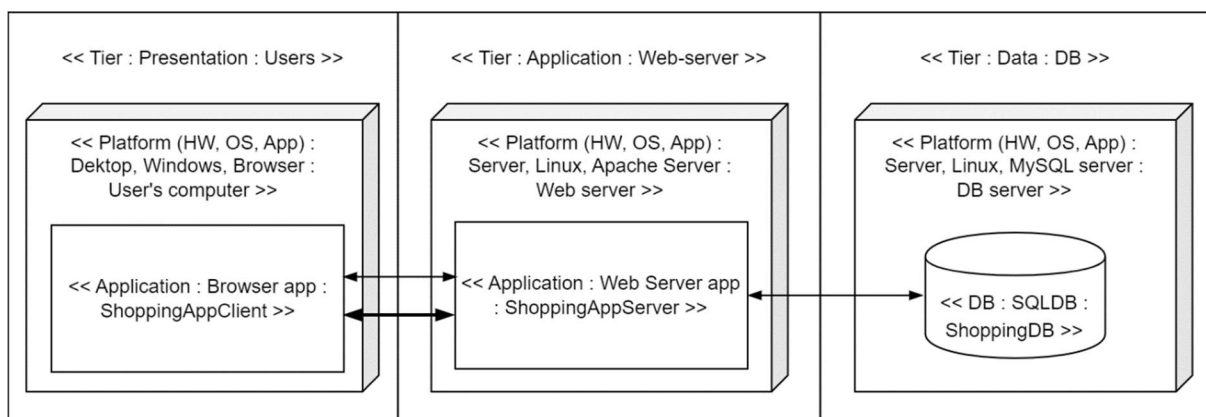


Figure 1: A sample application diagram

The second model is named the level-2 process-view model, which models the configuration of the processing components – model and controllers – and views within a particular application included in the level-1 application diagram. Figure 2 illustrates a sample process-view diagram.

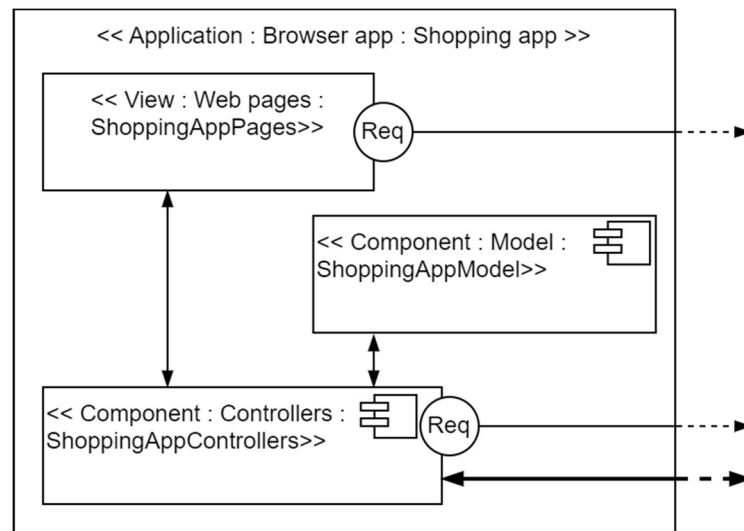


Figure 2: A sample process-view diagram

This research also provides a new labelling format to denote more details consistently and a set of notations to illustrate the communication flows by separating standard HTTP from DC. UML profiles for the new models and modelling notations are specified using the UML's extension mechanism.

The introduced models, not covered by the available UML-based tools, meet the requirements of the high-level design of RiWAs, aligning them with the Rich Web-based Applications Architectural style (RiWAArch style) [12]. Because these models use a minimal set of extra notations (compared to the UML metamodel), they can be seen as a comprehensive solution requiring the users' minimal learning effort.

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