Transforming Javascript Event-Loop Into a Pipeline

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ABSTRACT

The development of a real-time web application often starts with a feature-driven approach allowing to quickly react to users feedbacks. However, this approach poorly scales in performance. Yet, the user-base can increase by an order of magnitude in a matter of hours. This first approach is unable to deal with the highest connections spikes. It leads the development team to shift to a scalable approach often linked to new development paradigm such as dataflow programming. This shift of technology is disruptive and continuity-threatening. To avoid it, we propose to abstract the feature-driven development into a more scalable high-level language. Indeed, reasoning on this high-level language allows to dynamically cope with user-base size evolutions.

We propose a compilation approach that transforms a Javascript, single-threaded real-time web application into a network of small independent parts communicating by message streams. We named these parts *fluxions*, by contraction between a flow[1] and a function. The independence of these parts allows their execution to be parallel, and to organize an application on several processors to cope with its load, in a similar way network routers do with IP traffic. We test this approach by applying the compiler to a real web application. We transform this application to parallelize the execution of an independent part and present the result.

Categories and Subject Descriptors

Software and its engineering [**Software notations and tools**]: Compilers—*Runtime environments*

Keywords

Flow programming, Web, Javascript

[1] fluxinfrench

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