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To Whom It May Concern

It is my pleasure to write a recommendation letter for the “LOcal REasoning for Self-Adaptive Networks” (LORESAN) project. The goal of this project is the development of push-button methods for the formal verification of high-level models, used in the early stages of the design of large-scale distributed networks (datacenters, blockchains, etc.).

The project is centered on a resource logic, used to describe the coordinating architecture of the network. Resource logics e.g. Separation Logic, have been traditionally used in program verification, to reason about static resources, such as heap memory, by describing mutations with reference only to the cells involved in the action. This style of local reasoning has proved to be successful in scaling up program analysis and is currently used by major software editors, such as Facebook.

The novelty of the LORESAN project is considering resource logics for reasoning about reconfigurations of distributed systems, in which the processes in the network do not simply share and own passive resources (memory), they are resources themselves. The project is organized as several orthogonal work packages, aimed at building automated tool support for proof generation and model checking. The outcome of the project is a framework for rigorous model-based design of distributed systems, represented at a high level of abstraction.

I find the project’s vision ground-breaking and realistic. Its aims are topical and challenging. The blockchain technology badly lacks rigorous design approaches allowing evidence of trustworthiness guarantees. The team has demonstrated expertise in modelling reconfigurable dynamic systems and has already developed original semi-algorithms for their verification.

The work in the LORESAN project is closely related to the BIP component framework and its extension for modeling dynamically reconfigurable systems (DR-BIP). The approach in LORESAN supports the same idea of modularity, by separating the aspects of behavior and coordination.

As the founder of the BIP project at Verimag, I have a long and constant collaboration of about thirty years with the project coordinator Marius Bozga, and more recently with Radu Iosif. I highly esteem their dynamism and dedication, their competence and ability to link theory to relevant problems. Furthermore, with Igor Konnov, when he was a researcher at TU Wien, we have collaborated to develop the very first results on the verification of parameterized systems described in BIP, published at Concur 2016.

I am very much excited to see the outcome of this project and I would be happy to stay in close contact with the members of the LORESAN consortium.

I therefore fully support this proposal in the strongest possible terms.

With Best Regards,

A handwritten signature in blue ink, appearing to read 'Sifakis', with a stylized flourish at the end.

Joseph SIFAKIS  
Emeritus Research Director at the French National Research Center (CNRS),  
Turing Award 2007.