Re: Peer Response

by Saleh Almarzooqi - Monday, 1 September 2025, 7:13 AM

Hi Abdulrahman,

You hit the nail on the head about reasons why ACLs like KQML were invented: it is about going beyond sharing raw data (with all the uncertainty about what this data is) to sharing intentions and goals. I would agree with your argument that this higher-level communication is especially powerful in heterogeneous, open systems like e-commerce or supply chain networks. As Finin, Tim, et al. (1994) pointed out, the introduction of the performatives ask and achieve was an important step towards enabling agents to negotiate, cooperate, and collaborate across a range of platforms.

You also made an excellent comment regarding the practical limits of ACLs. The overhead of parsing semantics and the difficulty of sharing ontologies are non-trivial, particularly in time-sensitive environments. This accounts for the preference of many practitioners for simpler mechanisms such as APIs or method calls using Python or Java. As discussed by Kone, Shimazu, and Nakajima (2000), although ACLs are conceptually elegant, they are often too complex to be useful in a tightly managed environment.

From a different angle, it is reasonable to anticipate that ACLs will take on renewed importance as intelligent systems become increasingly distributed and autonomous (Soon, On, Anthony, and Hamdan, 2018). For example, modern multi-agent system frameworks such as JADE seek to simplify the story by including libraries that bring ACL concepts close to mainstream programming languages (Chaib-draa and Dignum, 2002). This hybrid approach may support a trade-off between the efficiency of method invocation and the semantic expressiveness of the ACLs.

ACLs look like a move in AI from the execution of tasks to real communication and negotiation. This angle lends itself to modern research in autonomous systems, where collaboration and adaptability are also important factors besides raw performance.

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Re: Peer Response

by Saleh Almarzooqi - Monday, 1 September 2025, 7:15 AM

Hi Shaikah,

Your post draws a very clear separation between the role of ACLs and method invocation. Especially, I am thankful for your focus on the semantic richness of ACLs such that performatives like ask and inform not only enable agents to communicate about facts, but also negotiate and reason about intentions. This reflects the idea behind ACLs being more than a communication protocol, but a mechanism for collaborative problem-solving across heterogeneous environments (Labrou and Finin, 1997).

I also subscribe to your characterisation of ontology management as a critical challenge. As reported by Mayfield, Labrou, and Finin (1995), even if the agents follow the KQML specification, the lack of a shared or standard ontology has led to misunderstanding. This makes deployments of ACLs in practice challenging outside of research settings (Singh, 2000). The same is the reason why many industries still stick to simpler alternatives like APIs, where the meaning is tightly controlled by predefined schemas.

An additional perspective that merits attention is that hybrid approaches are increasingly being developed to deal with those trade-offs. For instance, frameworks like JADE extend FIPA-ACL semantics with concrete programming primitives, thus simplifying the development task for the developer (Labrou and Finin, 1998). This lets systems gain from the intent-oriented communication of ACLs while preserving some of the performance of traditional method calls.

ACLs are well-suited to open, autonomous environments where reason and negotiation are required, while method invocation is well-suited to controlled, tightly coupled systems. This trade-off has continued to be at the heart of AI research and applications.

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