Rayyan, your discussion offers an insightful comparison between agent communication languages (ACLs) and traditional method invocation, and I particularly appreciate how you highlight **semantic abstraction** as a key strength of ACLs. As you rightly note, the ability of agents to exchange information without requiring knowledge of each other’s internal workings represents a major step toward interoperability and autonomy (Labrou, Finin and Peng, 1999). This abstraction is precisely what enables multi-agent systems to scale across diverse platforms and programming environments.

I would like to expand on your point regarding **standardisation**. The performatives defined by frameworks such as FIPA-ACL not only facilitate structured communication but also encourage **social reasoning**, where agents can interpret messages in context—allowing for negotiation, trust formation, and adaptive coordination (FIPA, 2002; Singh, 2013). This makes ACLs particularly powerful in dynamic domains such as smart grids or intelligent transportation systems, where distributed agents must continuously cooperate under uncertainty.

However, your observation about computational cost is also crucial. As you mentioned, the **semantic parsing and reasoning overhead** in ACLs can limit performance in real-time applications. To mitigate this, hybrid architectures are emerging where lightweight message passing is combined with semantic reasoning layers only when necessary (Gambetta et al., 2020). Such approaches strike a balance between the **efficiency of method invocation** and the **intelligence of ACL-based communication**.

Overall, your post effectively highlights how ACLs offer depth and adaptability, albeit with trade-offs that developers must carefully manage.

references:

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