Boxed Ambients with Communication Interfaces *

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Abstract. **BACI** *(Boxed Ambients with Communication Interfaces)* is a calculus for concurrent (functional) processes featuring mobility. BALI is a variant of the Boxed Ambients calculus. Processes are contained inside ambients (or boxes). Each ambient has a distinguishing name and can contain other ambients, forming a hierarchical structure of nested ambients. Processes send and receive data, and can also command its host ambient to move to another ambient.

A process is able to communicate with other processes within the same ambient, in the parent ambient, or in children ambients. Each communication has a particular type which is called *topic of conversation* (TOC). Neighboring processes exchange information through communication ports. Each ambient has its own communication port and processes inside the ambient uses that communication port to receive information. Ambients also carry a set of (local) assumptions about the TOCs between processes inside the ambient and any other neighboring processes. An ambient is allowed to move inside another ambient only if the set of typing assumptions of the migrating ambient is consistent with the assumptions on the new host ambient. **BACI** is flexible enough to allow different topics of conversation between an ambient and different parents, without compromising type-safety: it uses port names for communication and ambient names for mobility. This separation of concerns and the locality features give **BACI** more flexibility and expressiveness than its predecessors.

References

1. Eduardo Bonelli, Adriana Compagnoni, Mariangiola Dezani-Ciancaglini, and Pablo Garralda. Boxed Ambients with Commmunication Interfaces (BACI). In *Proceedings of the 29th International Symposium on Mathematical Foundations of Computer Science (MFCS 2004)*, Prague, Czech Republic, August 2004.
2. Michele Bugliesi, Giuseppe Castagna, and Silvia Crafa. Access Control for Mobile Agents: The Calculus of Boxed Ambients. *ACM Transactions on Programming Languages and Systems*, 26(1):57–124, 2004.

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