We present three refinement principles supporting the transition from system specifications based on (unbounded) asynchronous communication to system specifications based on (bounded) synchronous communication. We refer to these principles as partial, total and conditional refinement, respectively. We distinguish between two synchronization techniques, namely synchronization by hand-shake and synchronization by real-time constraints. Partial refinement supports synchronization by hand-shake with respect to safety properties. Total refinement supports synchronization by hand-shake with respect to both safety and liveness properties. Finally, conditional refinement supports both synchronization by hand-shake and by real-time constraints. We discuss, relate and show the use of these principles in a number of small examples.

Stichworte: Refinement; Boundedness Constraints; Compositionality

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