

**Table 11.3**

Attributes of several implicit multithreading proposals

	<b>Multiscalar</b>	<b>Disjoint Eager Execution (DEE)</b>	<b>Dynamic Multi-threading (DMT)</b>	<b>Thread-Level Speculation (TLS)</b>
Control flow attribute exploited	Control independence	Control independence, cumulative branch misprediction	Control independence	Control independence
Source of implicit threads	Loop bodies, control flow joins	Loop bodies, control flow joins, cumulative branch mispredictions	Loop exits, subroutine returns	Loop bodies
Thread creation mechanism	Software/compiler	Implicit hardware	Implicit hardware	Software/compiler
Thread creation and sequencing	Program order	Out of program order	Out of program order	Program order
Thread execution	Distributed processing elements	Shared processing elements	Shared multithreaded processing elements	Separate CPUs
Register data dependences	Software with hardware speculation support	Hardware; no speculation	Hardware; data dependence prediction and speculation	Disallowed; compiler must avoid
Memory data dependences	Hardware-supported speculation	Hardware	Hardware; prediction and speculation	Dependence speculation; checked with simple extension to MESI coherence

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