Summary
A scalable approach to thread level speculation.

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1 To be completed before class

What are the problems solved by this paper? (50 words)
Chip manufacturers are building commercial multi-core processors. But they are primarily used to increase throughput. One reason we could not use the multi-core processors to increase performance is our inability to parallelize applications. So there should be a mechanism to parallelize seemingly serial code. Also the mechanism has to be scalable. The paper tries to develop a mechanism that can automatically parallelize programs and that can be applicable to any machine which can support multiple threads.

What are the approaches attempted by this paper? (50 words)
The paper proposes to use thread-level speculation (TLS) to parallelize programs that have possible (but infrequent) dependencies between threads. The mechanism proposed is built over the invalidation based cache-coherence protocol, which is used in multiprocessor architectures with shared memory. So this mechanism can be used in any architectures which has shared memory. The compiler partitions the programs into threads which are run on the different processing elements. The sequential semantics is maintained with the help of 'epoch' numbers assigned to the different threads.

What are the main conclusions of this paper? (50 words)
The proposed mechanism achieves 8 – 46% speedup over single processor execution. The overhead due to the hardware and software mechanisms are reasonably small. This shows that speedup can be achieved with very small amount of hardware by using TLS. Applications like buk and equake are almost insensitive to communication overhead showing that TLS can be very effective in multiprocessor configurations with very large communication overhead. Thus using the scalable approach proposed TLS can be effective on a large range of processor configurations.

2 To be completed after class

Did this paper address an important issue? Explain. (100 words)

Are the proposed approaches valid? Describe its strength and weakness. (100 words)

Do the results support the conclusions? Explain. (100 words)
Describe the potential future works? (100 words)