FINAL PROJECT PRESENTATIONS
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Dynamic Scheduling Approach to SDF in DSP Network

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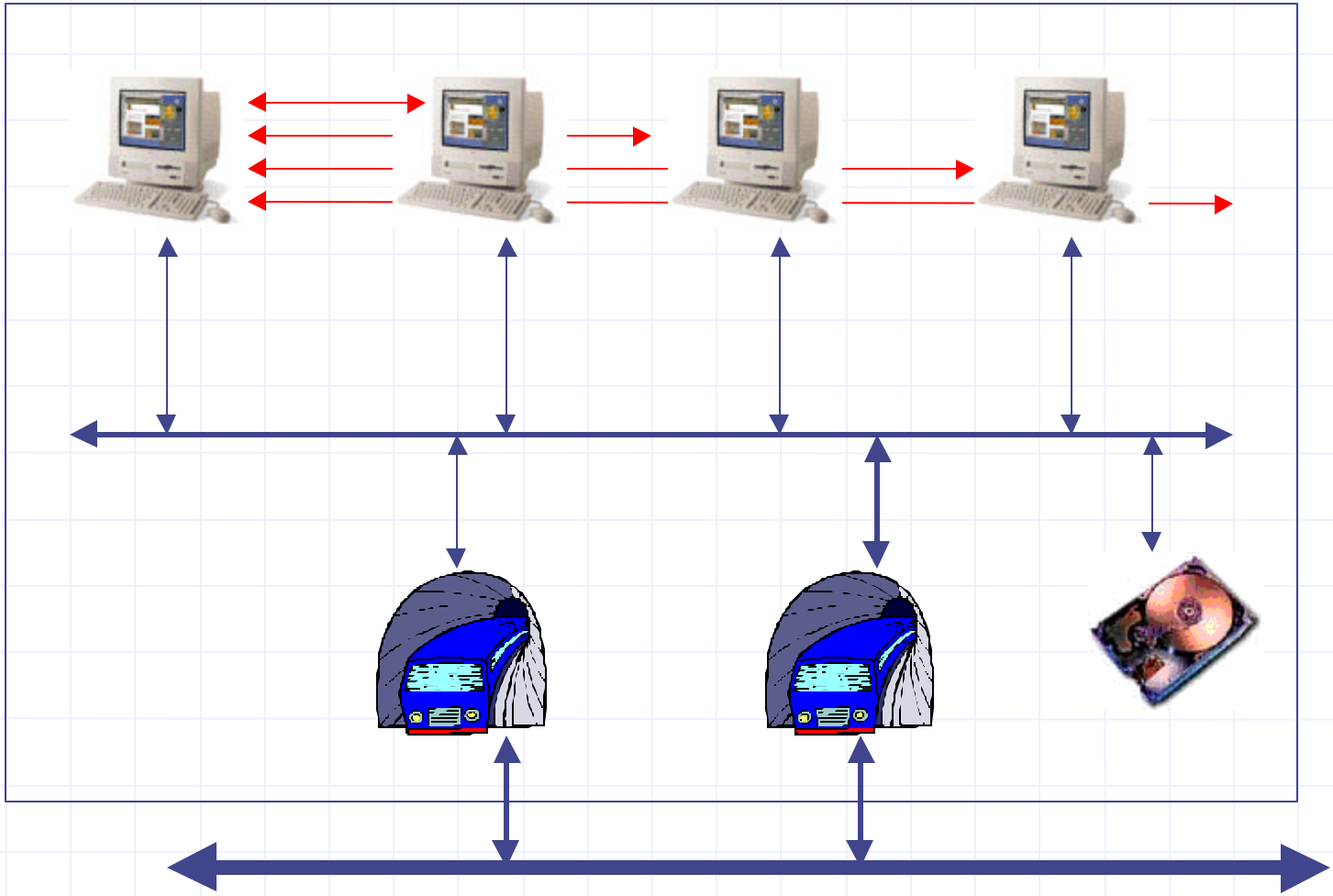
What is this project about?

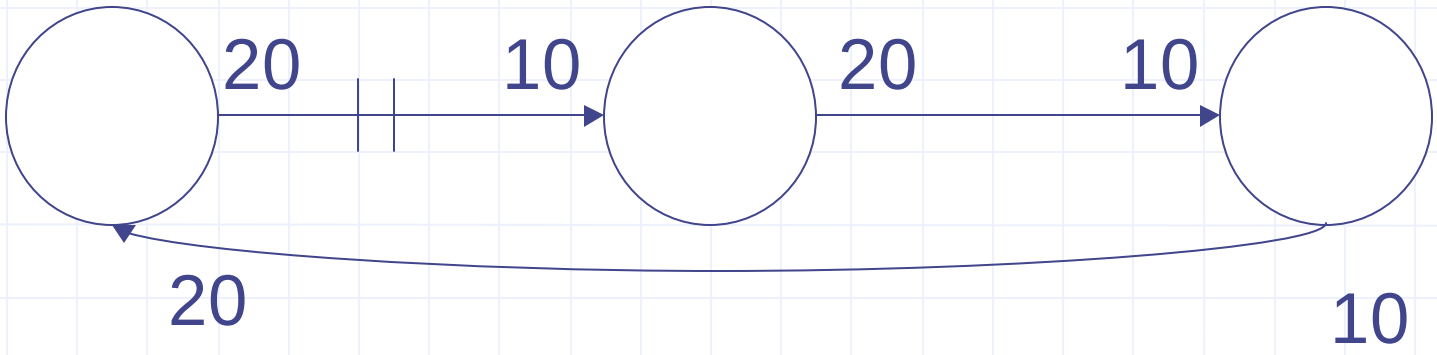
- Propose a Dynamic Scheduling Approach to SDF in DSP Network
- Construct a Model Using Opnet to Do algorithm simulation
- Simulate Scenario to verify the feasibility

What does DSP Network Look Like?



What is Synchronous DataFlow Graph?

$$\begin{vmatrix} 20 & -10 & 0 \\ 0 & 20 & 0 \\ -20 & 0 & 10 \end{vmatrix}$$



Why Static Scheduling?

- Input & Output Token is known
- It can be done at compilation time
- Transport Overhead is minimized
- Algorithm is Optimized

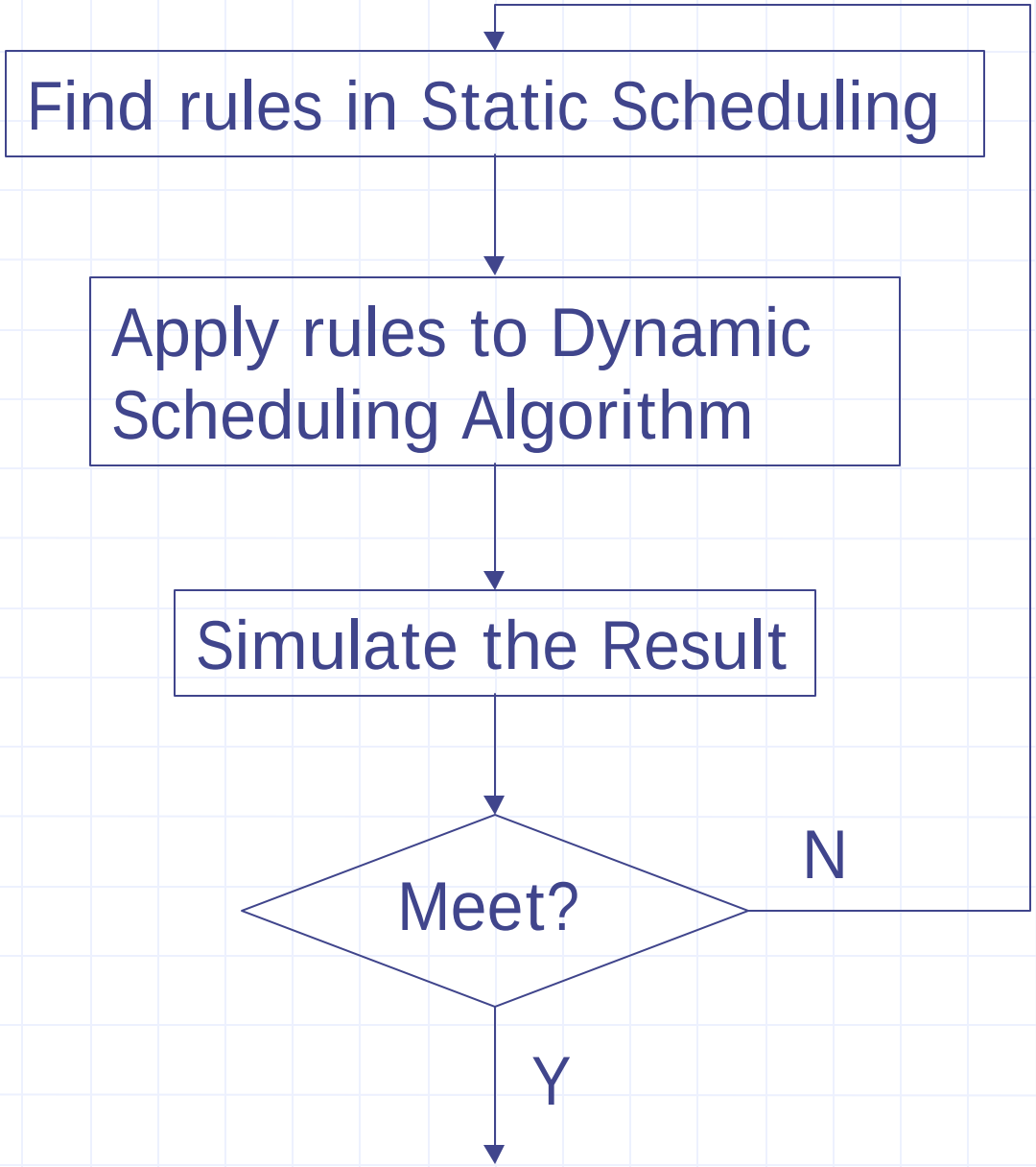
Why Dynamic Scheduling?

- Rules oriented instead of detail oriented
- Schedule done at run time
- Better Scalability
- Easy to maintain the software

What is Dynamic Scheduling Approach to SDF?

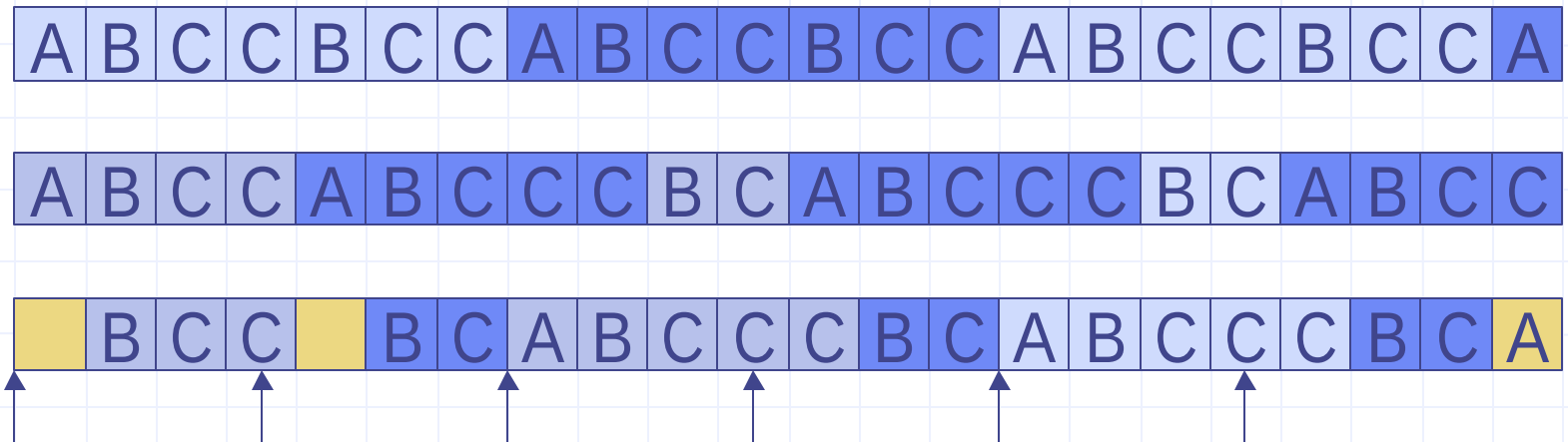
- All Static Scheduling Algorithm can have a Dynamic Scheduling Approach with more or less finite rules
- Dynamic Approach should have as little knowledge as possible
- The Dynamic Scheduling Approach meets performance level in basic environment, out performs in others

How to Find the Approach?

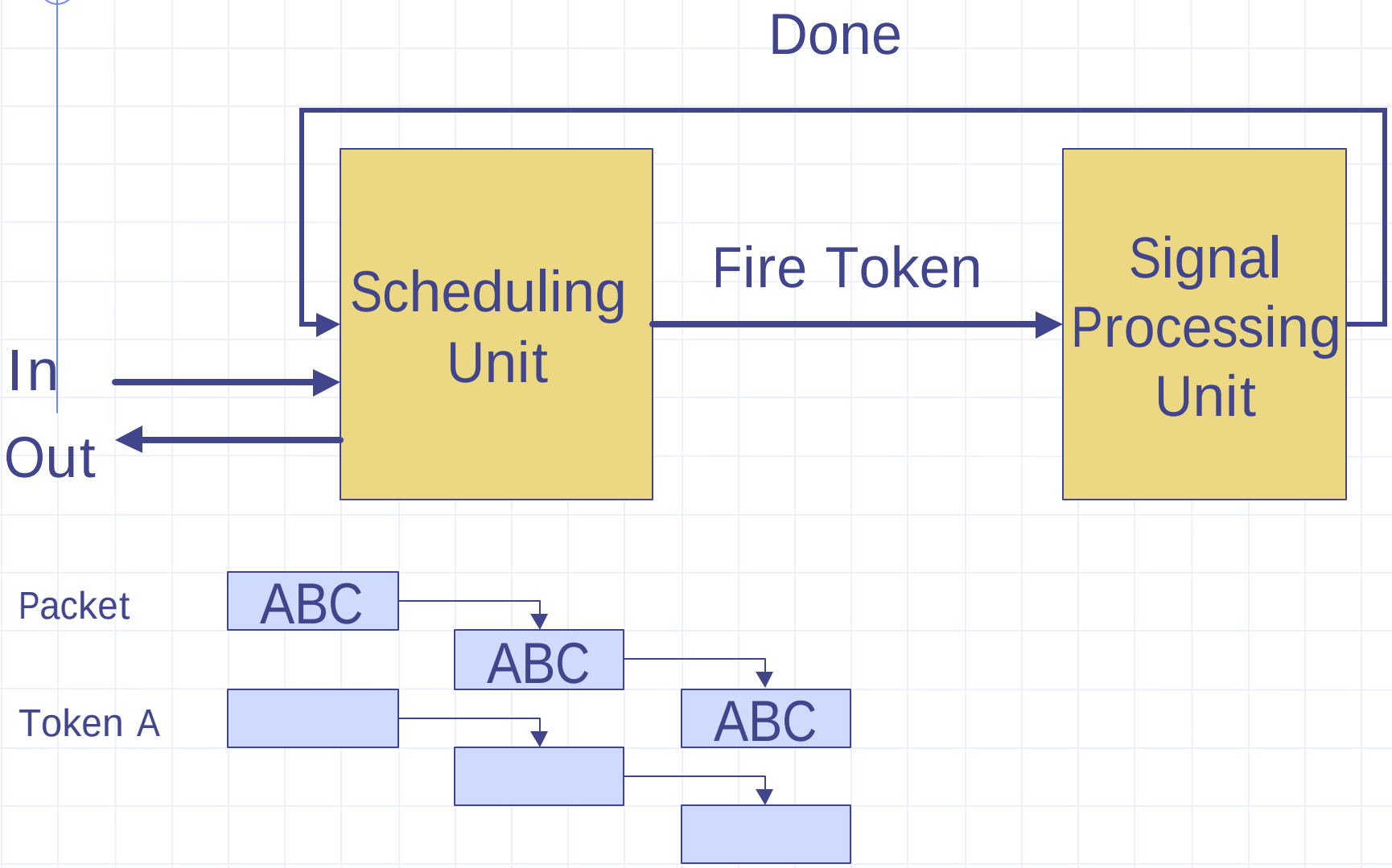


What are the rules? Explicit and Implicit

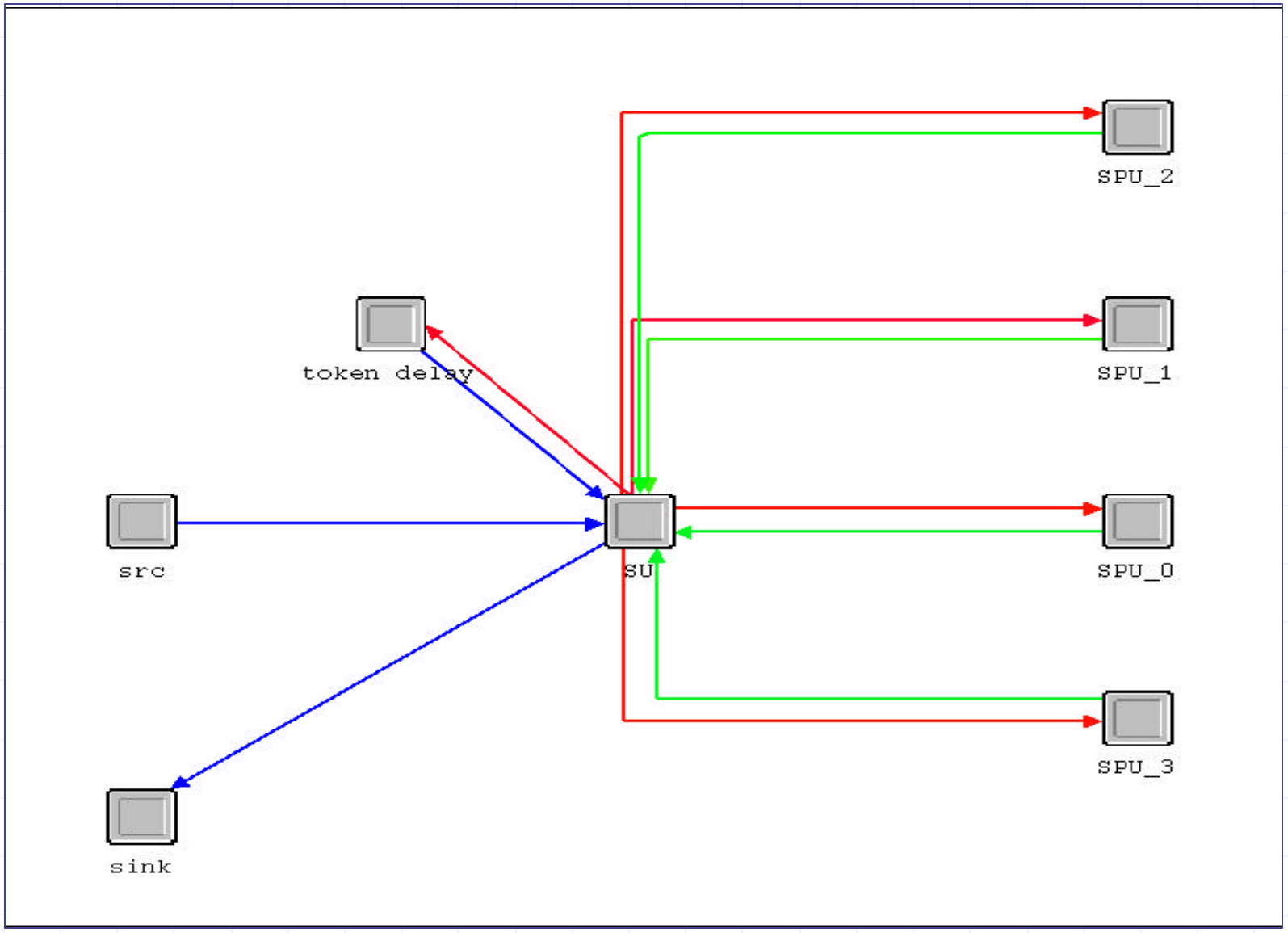
- Shortest ETE Delay
- First In First Out
- Smallest Jitter
- Optimum Memory Buffer
- Task Load Balance
- CPU Load Balance



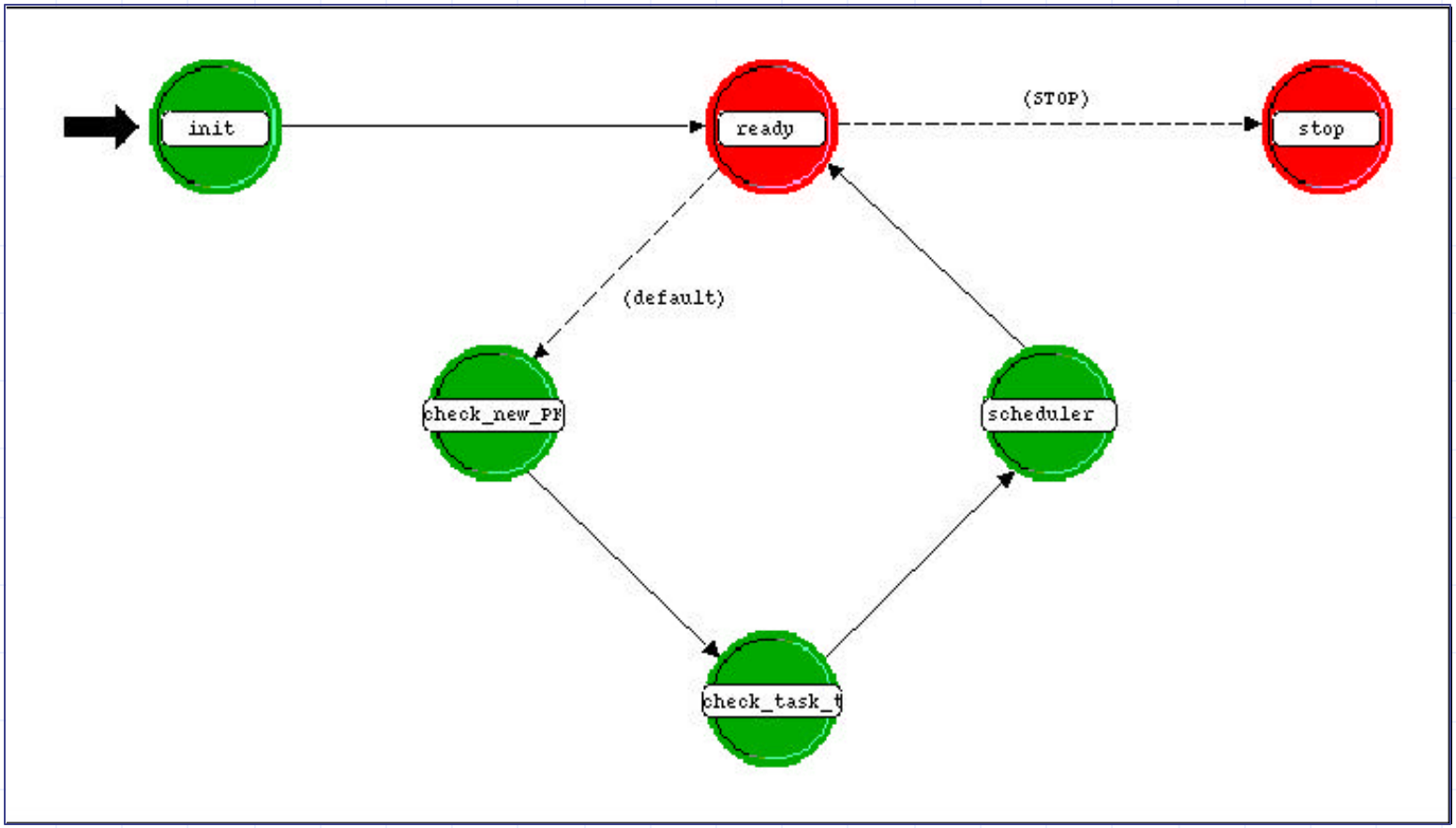
How to map a model?



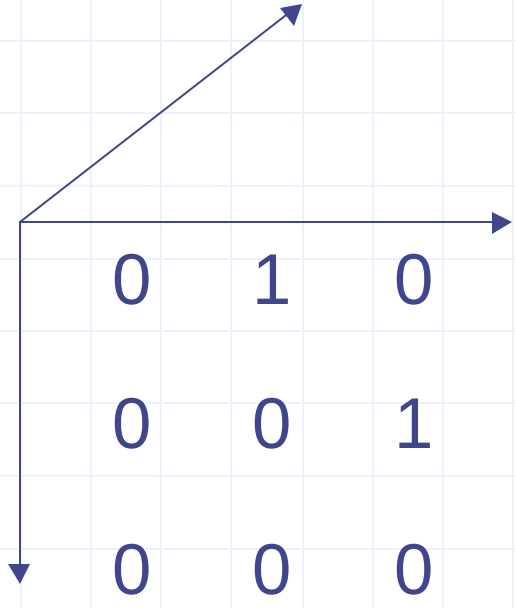
How does Model in Opnet look like?



Processes Implemetation



How to model a Synchronous Data Flow Graph?



Thresh hold Matrix

Creating matrix

Consume matrix

Token number matrix - status

Token queue matrix - status

Packet queue vector - status

Task name

Token Delay Matrix

Link Matrix

What is Simulation Result?

- Dynamic Scheduling Algorithm should be carefully chosen and simulated
- Combination of Algorithm may be used
- Dynamic Scheduling need time to merge to performance of Static Schedule

Difficulties and Future Works?

- Can we always be able to find a Dynamic Solution in all cases? Using known library?
- Can we tell the time to merge according to SDF Matrix?
- About Trade-Off from overhead created from Dynamic Scheduling, what is the balance?

References

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References

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[7] Shuvra S. Bhattacharyya, Praveen K. Murthy, and Edward A. Lee, "Synthesis of Embedded Software from Synchronous Dataflow Specifications," *Journal of VLSI Signal Processing Systems*, Vol. 21, No. 2, June 1999.

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[9] J. L. Pino, S.S. Bhattacharyya and E. A. Lee, *A Hierarchical Multiprocessor Scheduling Framework for Synchronous Dataflow Graphs,* UCB/ERL M95/36, May 30, 1995

That’s about it...

any question or comments?