

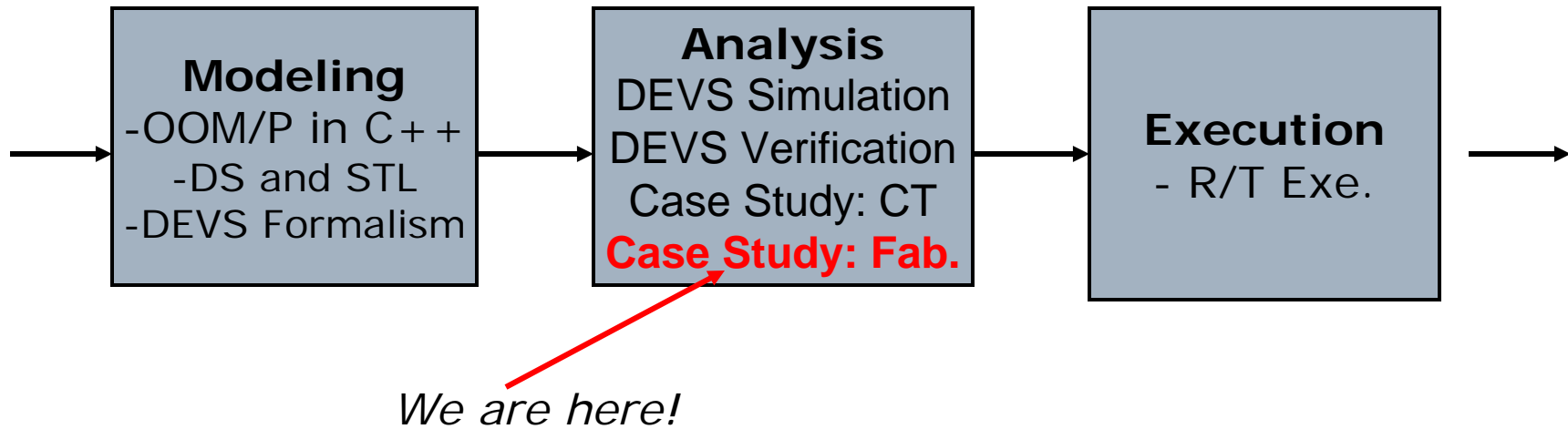
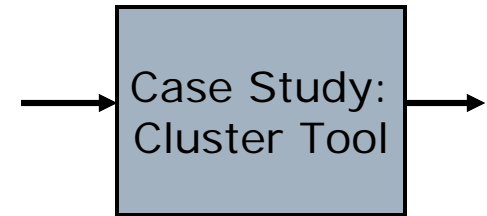
ECE575/ Chapter 12. Modeling and Simulation of Semiconductor Fabrication Systems using DEVS

Part4: Case Study

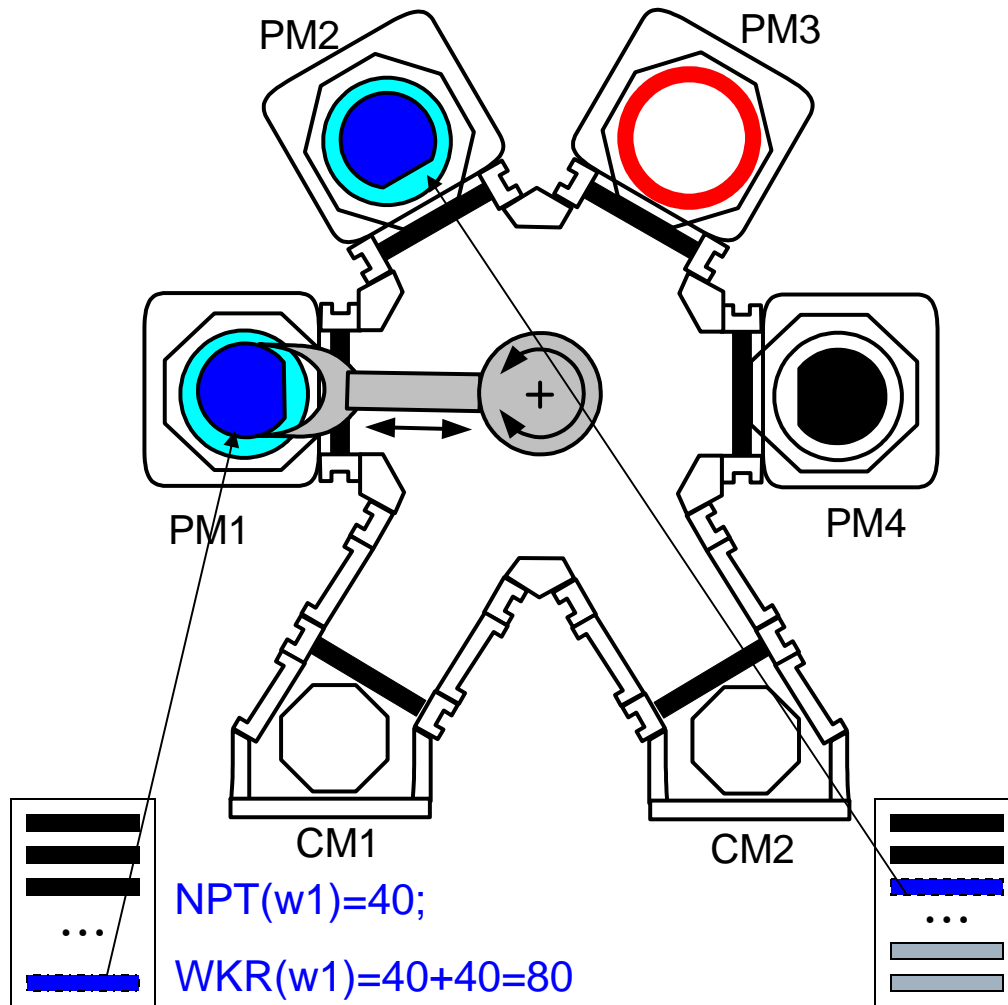
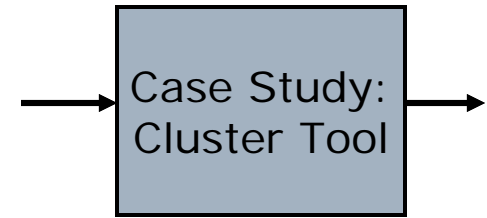
Moon Ho Hwang
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2006 Fall
ECE Department,
University of Arizona

Where are we now?



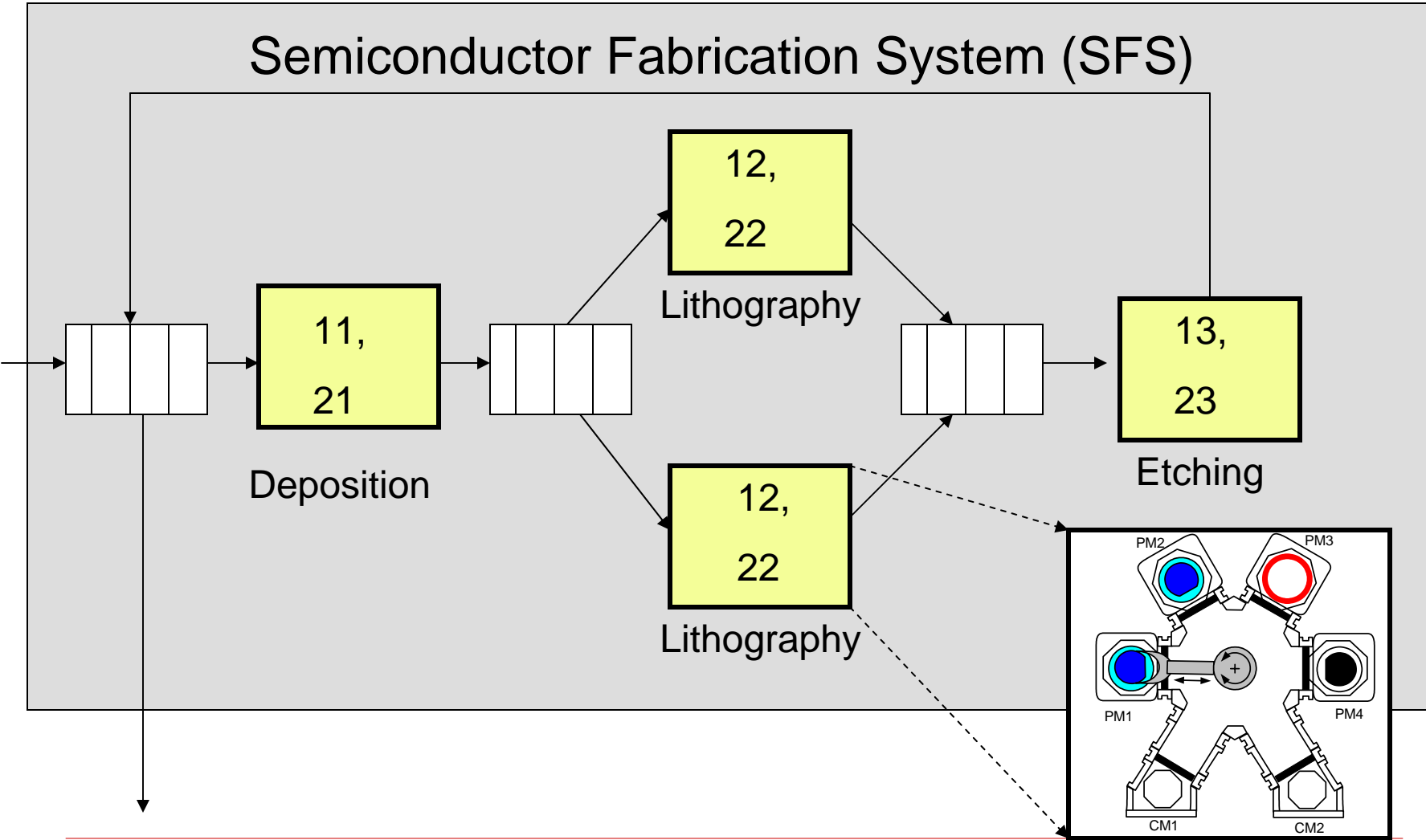
Motivation



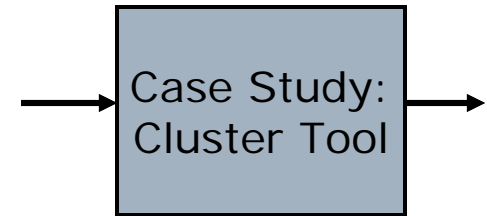
In simulation study of cluster tool (CT), we found that the **dynamic & global** dispatching rule such as LWKR (Least Work Remaining) is better than **static** (Fixed Order) or dynamic but **local** (SPT: Shortest next Processing Time) one.

Motivation

Case Study:
Cluster Tool

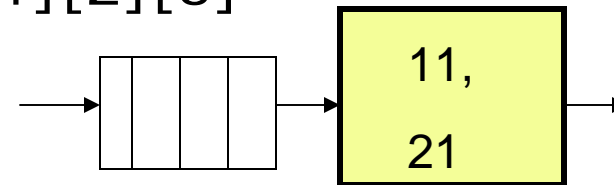


Motivation



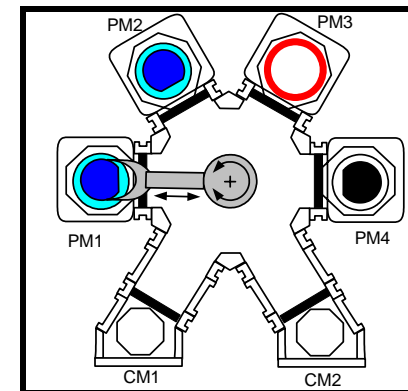
□ Scheduling Issues

- CT selecting Job in Qs [1][2][3]

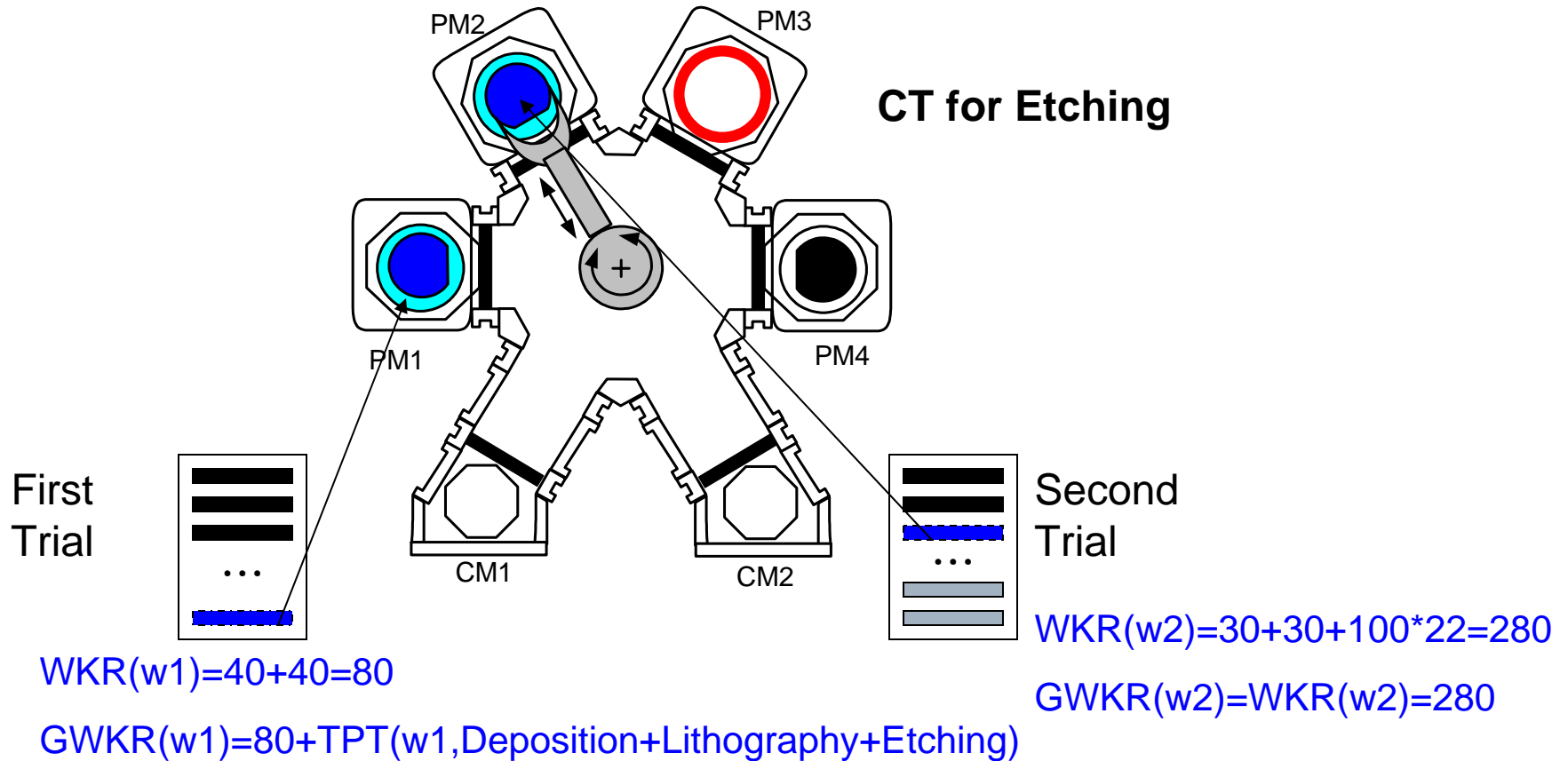
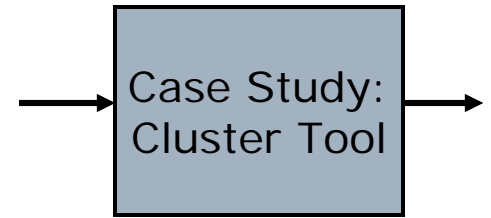


- PM selecting Wafer on CM or PM

No previous research applying LWRK considering global lot status of fabrication procedure.



LGWKR: Least Global WKR



DEVS Network Diagram

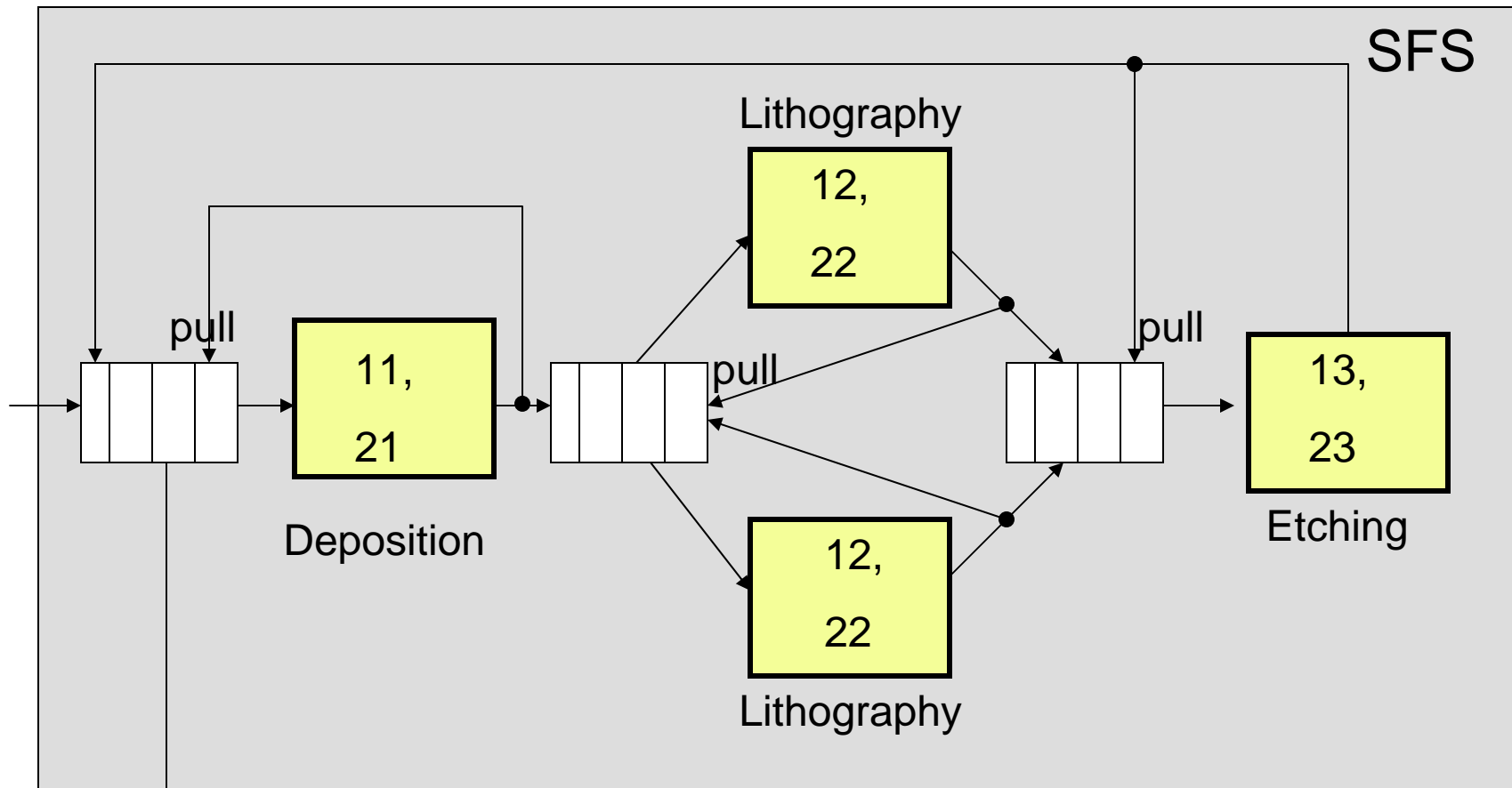
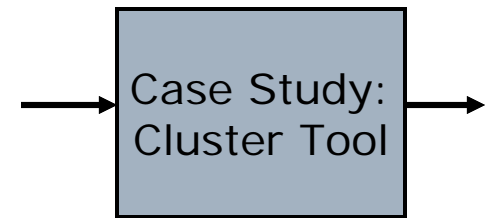


Diagram for Lot flows and Pull-signal flow

DEVS Network Diagram

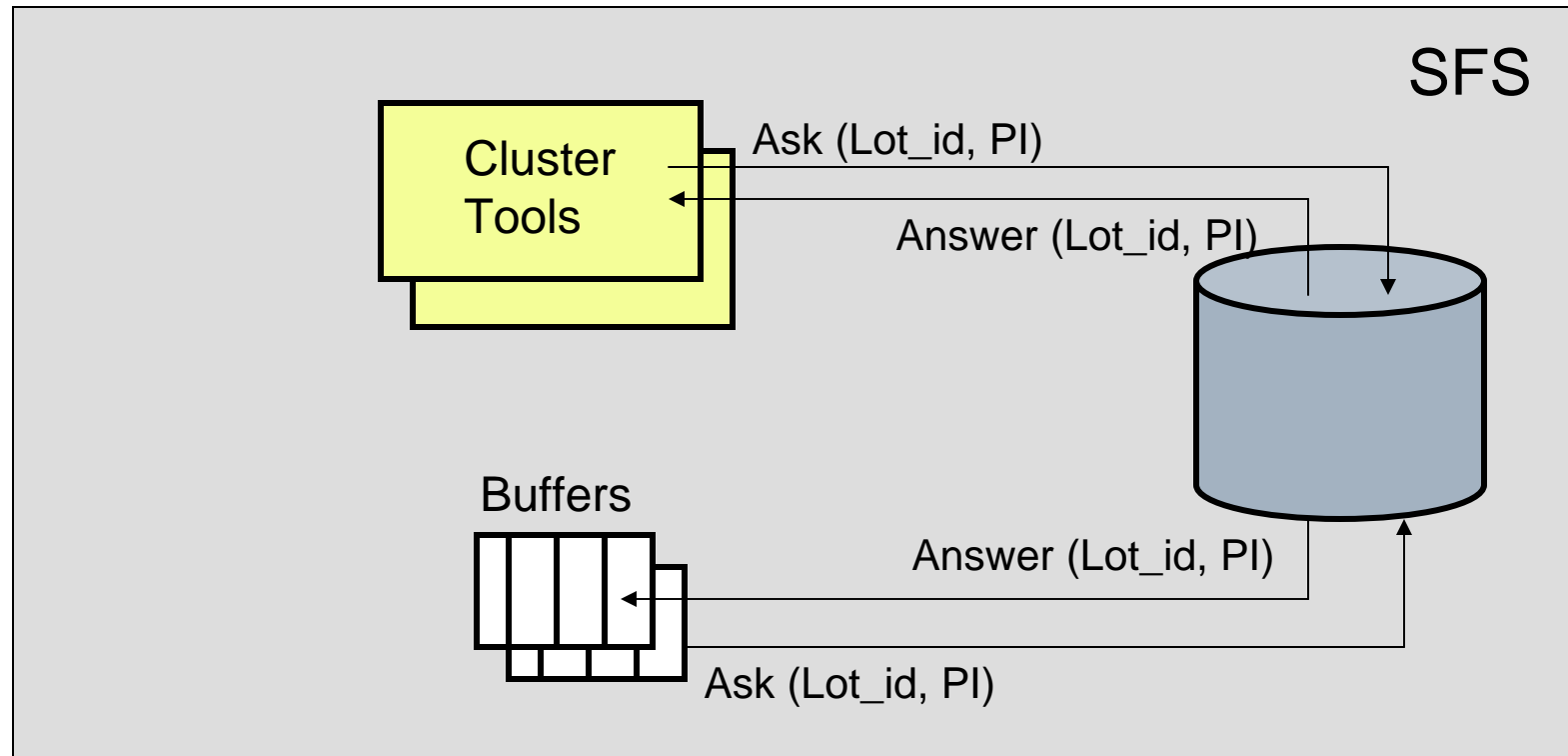
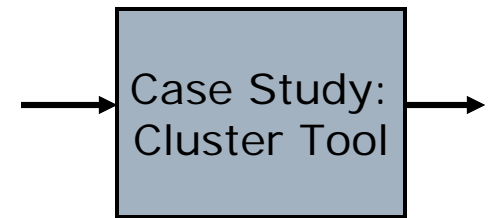
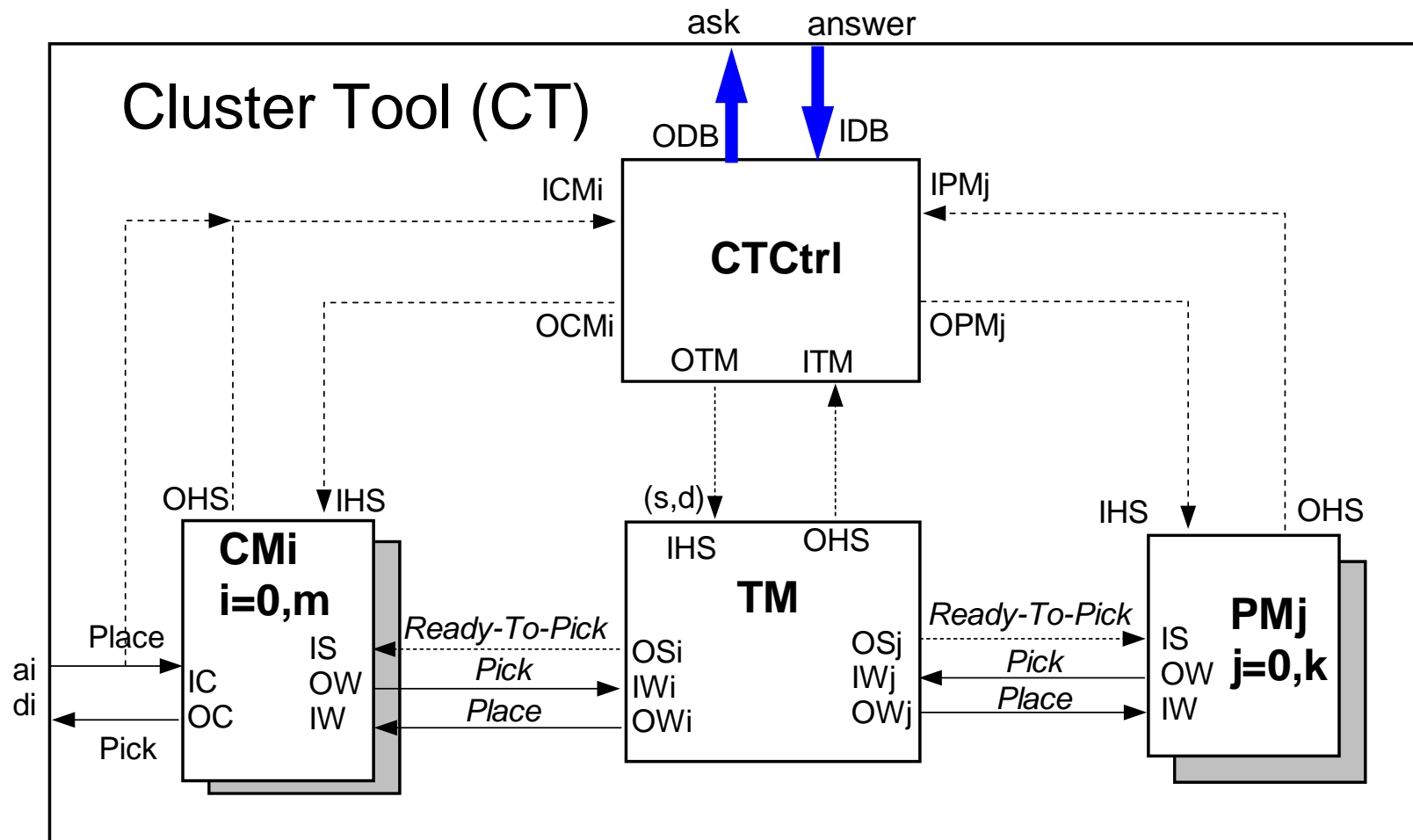
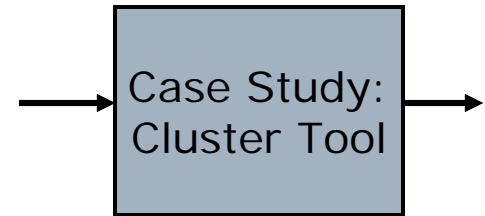
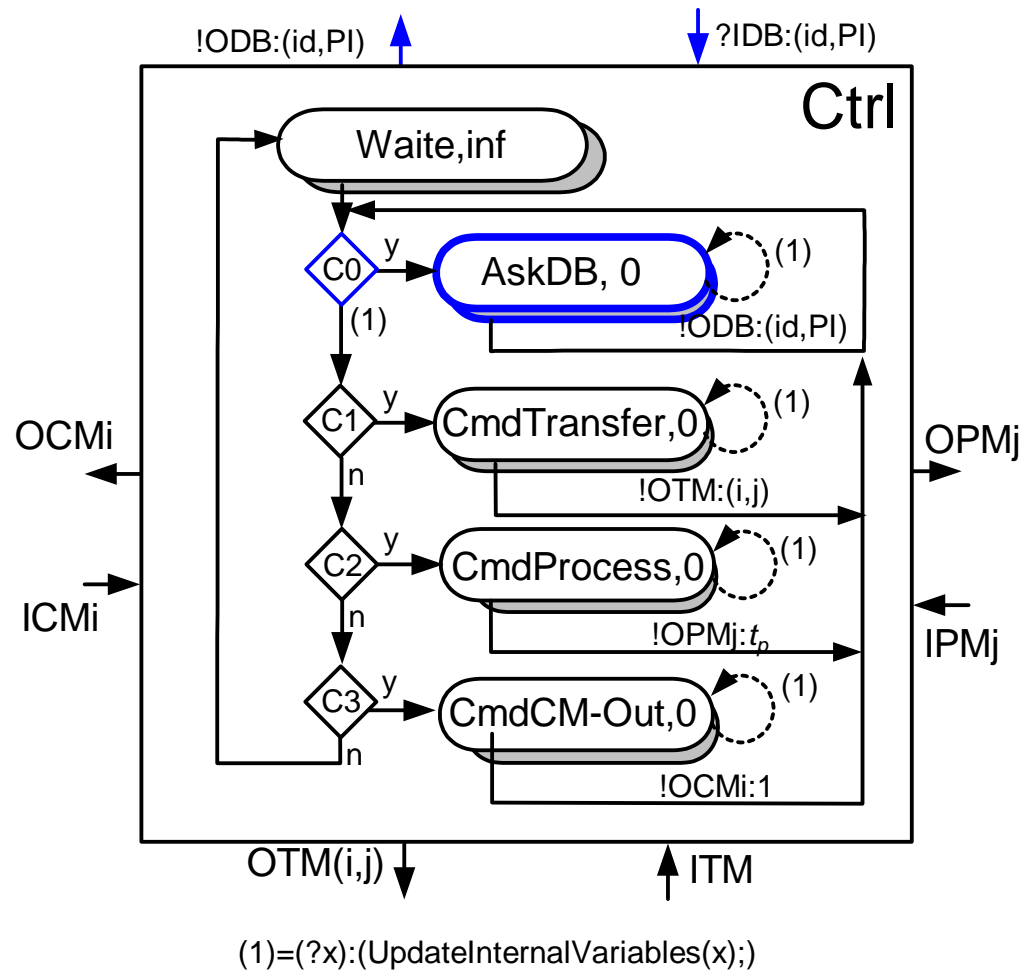
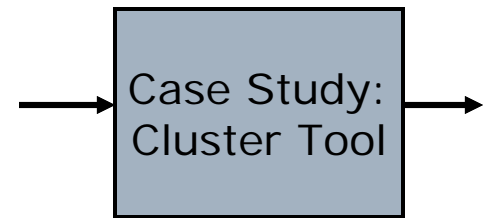


Diagram for DB Query Flows

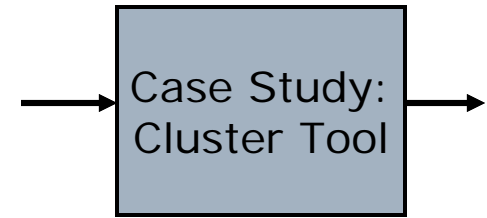
DEVS Network of CT



Atomic DEVS of Ctrl

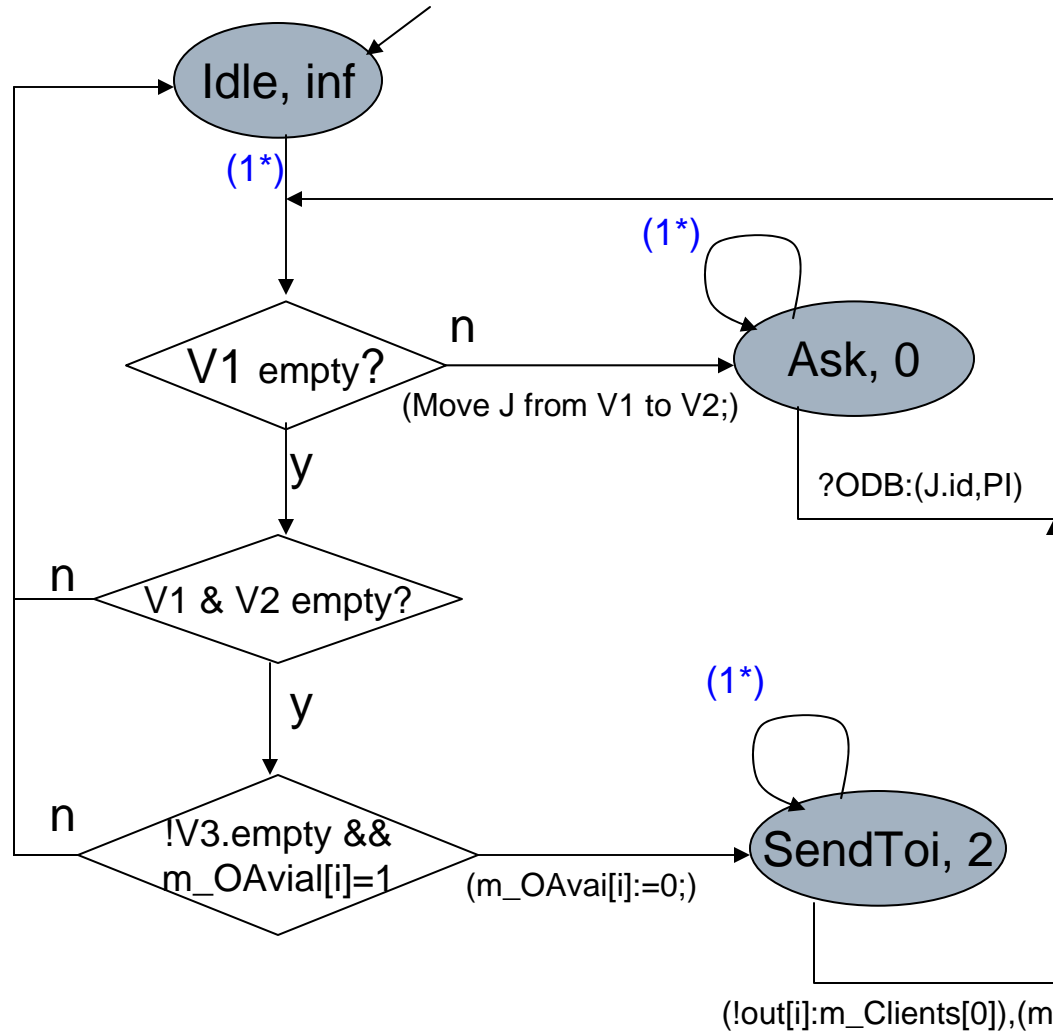


Buffer



```

•InputPort in; vector<InputPort> pull;
•Vector<OutputPort> out;
•string m_phase;
•vector<Job*> m_UnaskedClients; // V1
•vector<Job*> m_AskedClients; // V2
•vector<Job*> m_AnsweredClients; // V3
•vector<pair<lot_id, PI> >
    m_SelectionOrder; // V4
•vector<bool> m_OAvail;
    
```



(1*) means

(?in:J), (push J V1;) ||

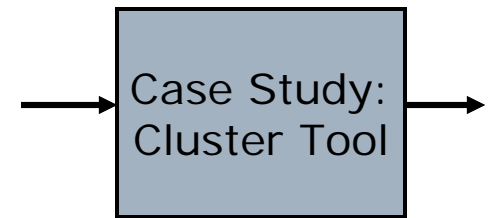
(?IDB:(id,PI)), (move J with id from V2 to V3) ||

(?in:c),(m_Clients.push_back(c);) ||

(?pull[i]), (m_OAvail[i]=1;)

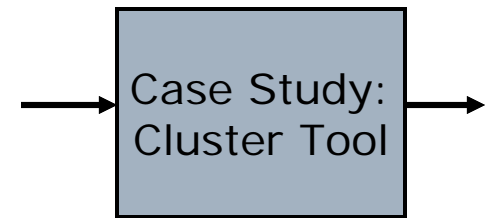


To be continued...



- Process Definition Model (PDM)

Reference



- [1] L.M. Wein, Scheduling Semiconductor Wafer Fabrication, IEEE Trans. On Semiconductor Manufacturing, V1,N3, Aug., p.115-130, 1988
- [2] S. Lu, D. Ramaswamy, R.R. Kumar, Efficient Scheduling Policies to Reduce Mean and Variance of Cycle-time in Semiconductor Manufacturing Plants, IEEE Trans. On Semiconductor Manufacturing, V7,N3, Aug., p374-388, 1994
- [3] Y.D. Kim, J.U. Kim, S.K. Lim, H.B. Jun, Due-Date Based Scheduling and Control Policies in a Multiproduct Semiconductor Wafer Fabrication Facility, IEEE Trans. On Semiconductor Manufacturing, V11, N1, Feb, p155-164, 1988