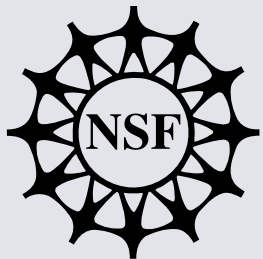


Trading Latency for Composability

Edited and presented by
Slobodan Matic
UC Berkeley



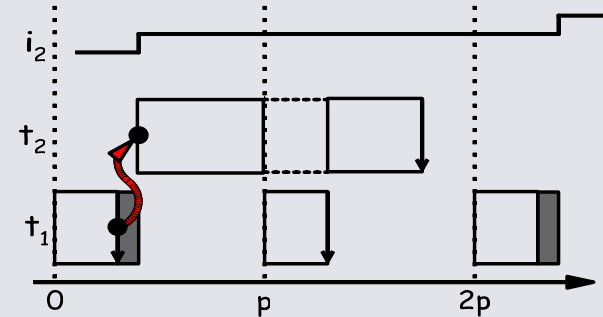
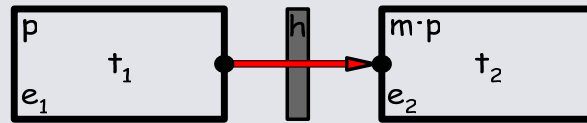
Chess Review
November 21, 2005
Berkeley, CA



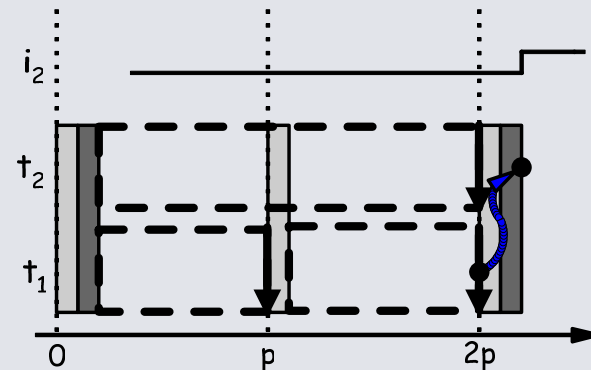
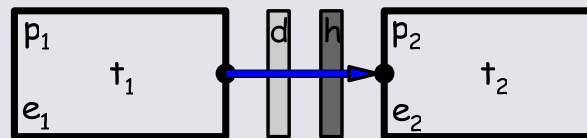
Simulink vs Giotto Semantics



- RTW (Simulink)
fast to slow connection



- LET (Giotto)
every connection



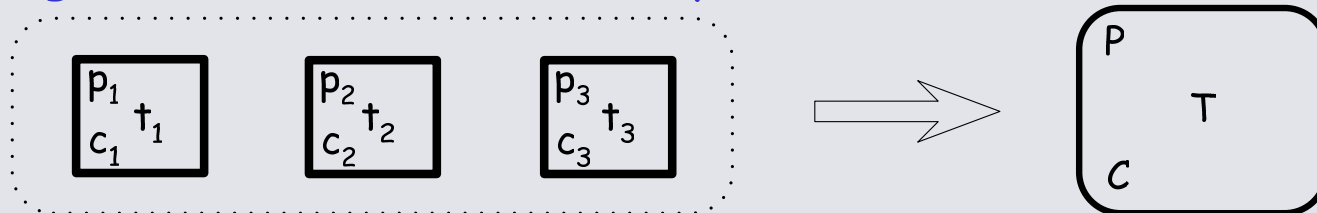
- Sequence of n tasks
RTW latency up to n times smaller



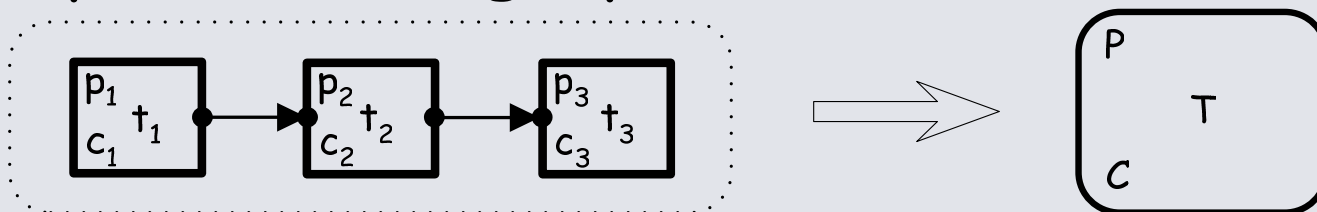
Composable Real-time Systems



- Real-time assurance + Flexibility
 - hierarchical scheduling frameworks
- Independent task group abstraction
 - periodic resource model (P,C)
 - guarantees C units in every P units



- Task precedence graphs



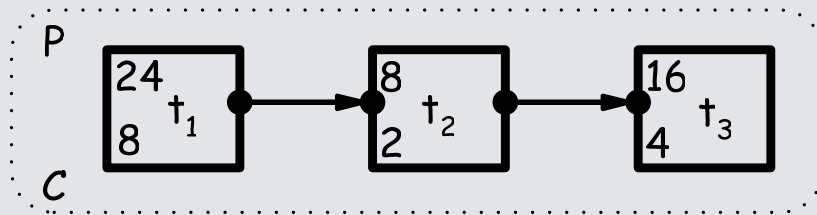
- intragroup, intergroup, distributed precedence



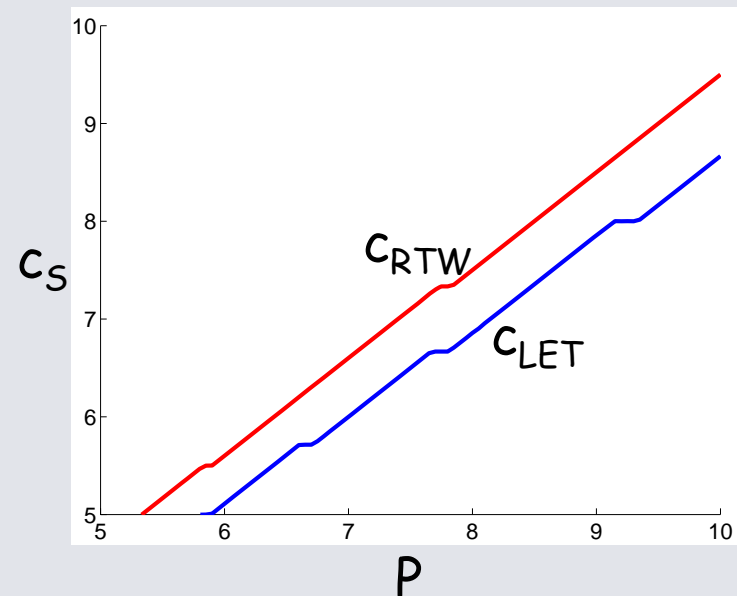
Intragroup Abstraction



- Task precedence within group, single resource
- Function c_S tightly abstracts G if $c_S(P)$ is smallest C s.t. G is schedulable with S under (P, C)
 - smaller c_S ! tighter abstraction ! better composability



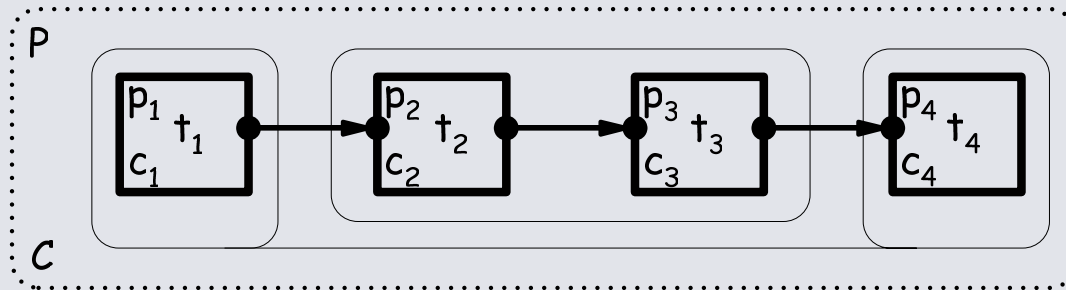
➤ For each G and P
 $c_{RTW}(P)$, $c_{LET}(P)$



Distributed / Intergroup Abstraction



- Distributed task graph over m resources
 - There exist G and P
 $c_{RTW}(P) - c_{LET}(P), (m-1)P$
- Task precedence between groups
 - hierarchical task graph



- LET compositional ($c_j \neq c$)
 - RTW not compositional

