

# GPGP and TÆMS

José M Vidal

Department of Computer Science and Engineering, University of South Carolina

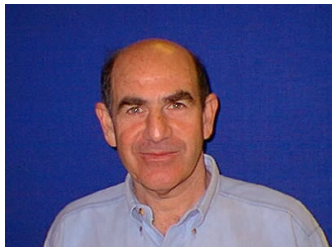
November 7, 2007

Abstract

Chapter 9

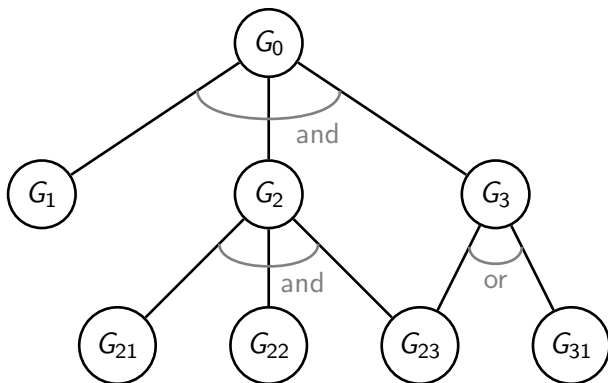


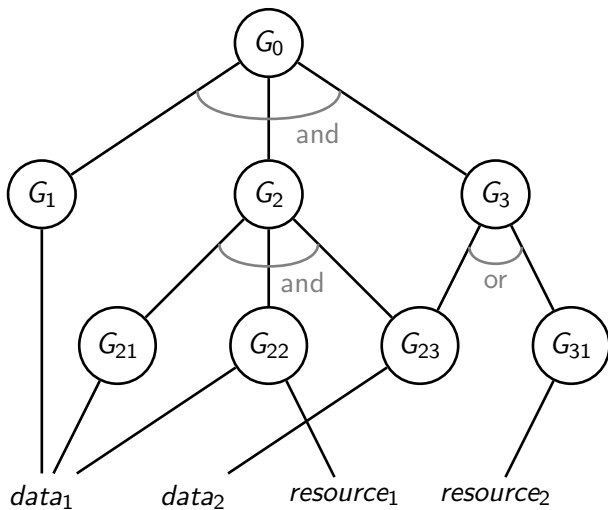
# Overview

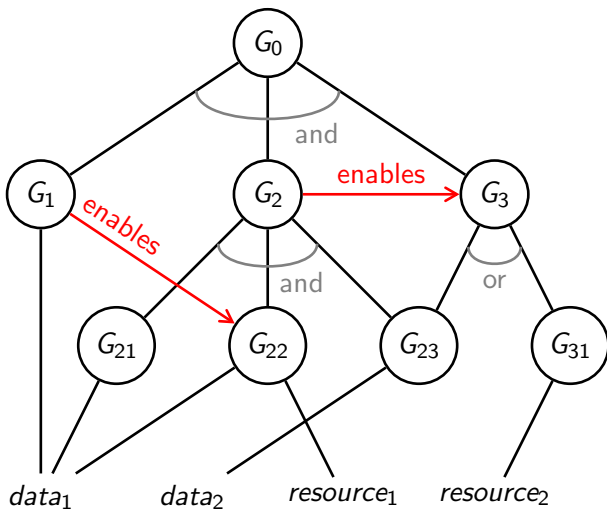


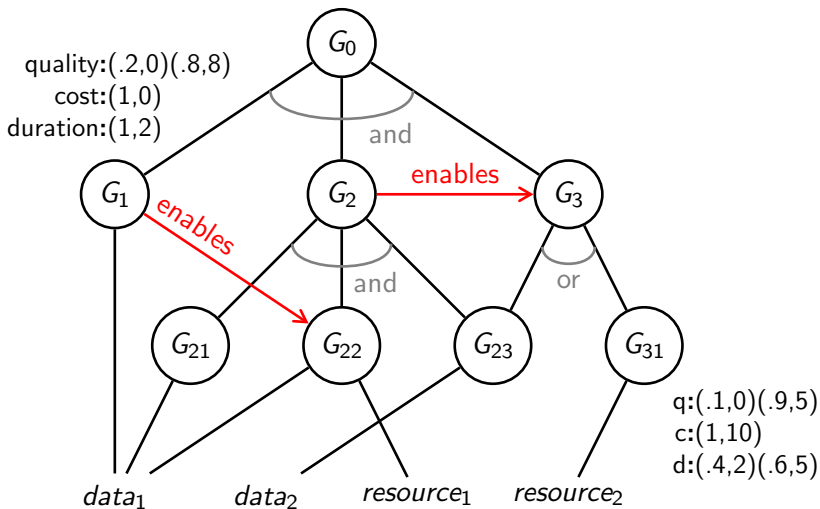
Victor Lesser, U. Mass.  
Amherst.

- **TÆMS**: language for representing task hierarchy.
- **GPGP**: scheduling and negotiation algorithm.
- Used by Lesser and students for decades on different problems.









# Quality Accumulation Functions

$q_{min}$  minimum quality of all subtasks

$q_{max}$  maximum quality of all subtasks

$q_{sum}$  aggregate quality of all subtasks

$q_{last}$  quality of most recently completed subtask

$q_{sum\_all}$  as with  $q_{sum}$  but all subtasks must be completed

$q_{seq\_min}$  as with  $q_{min}$  but all subtasks must be completed in order

$q_{seq\_max}$  as with  $q_{max}$  but all subtasks must be completed in order

Design-to-Criteria  
Scheduler

Schedule

Execution

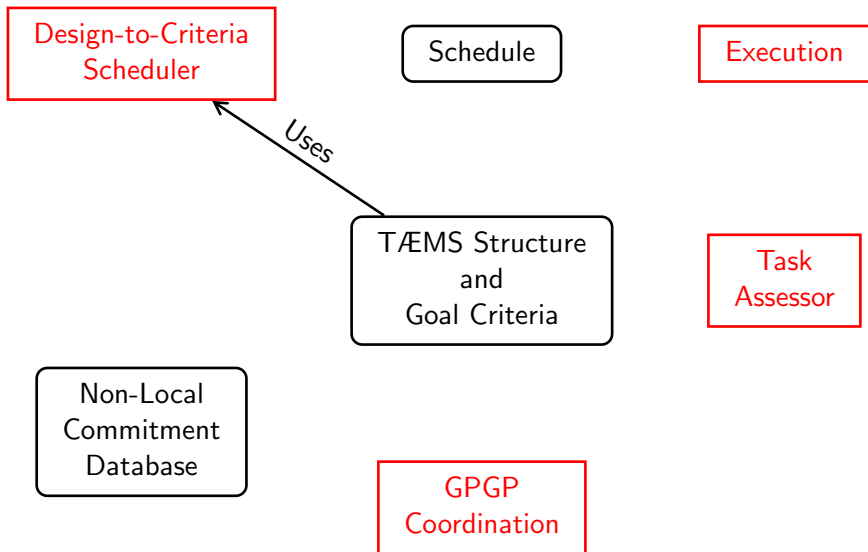
TÆMS Structure  
and  
Goal Criteria

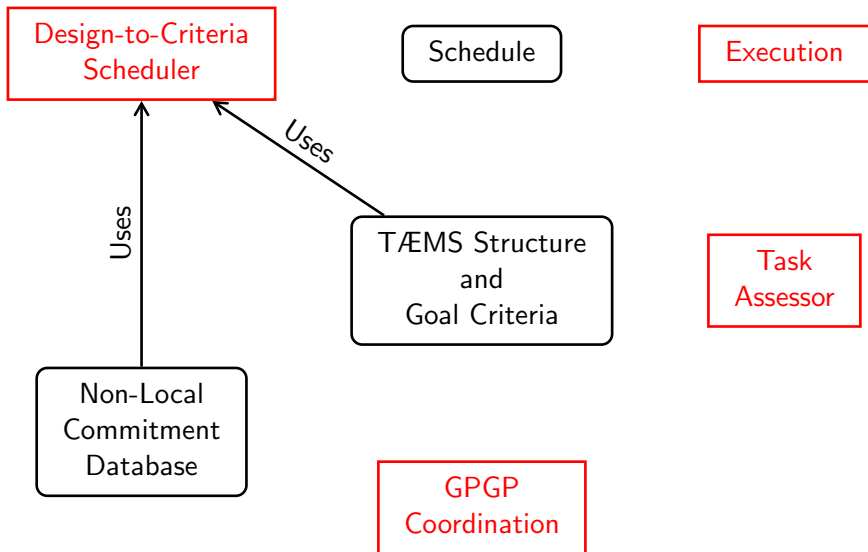
Task  
Assessor

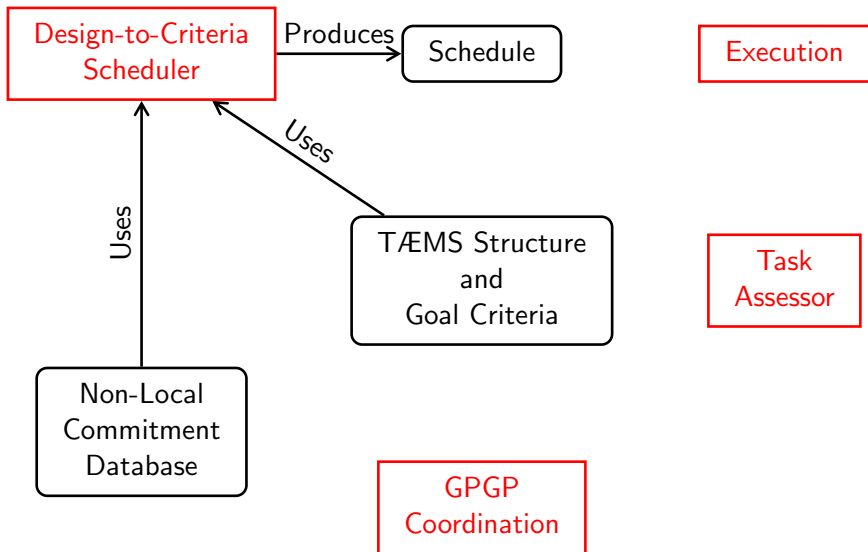
Non-Local  
Commitment  
Database

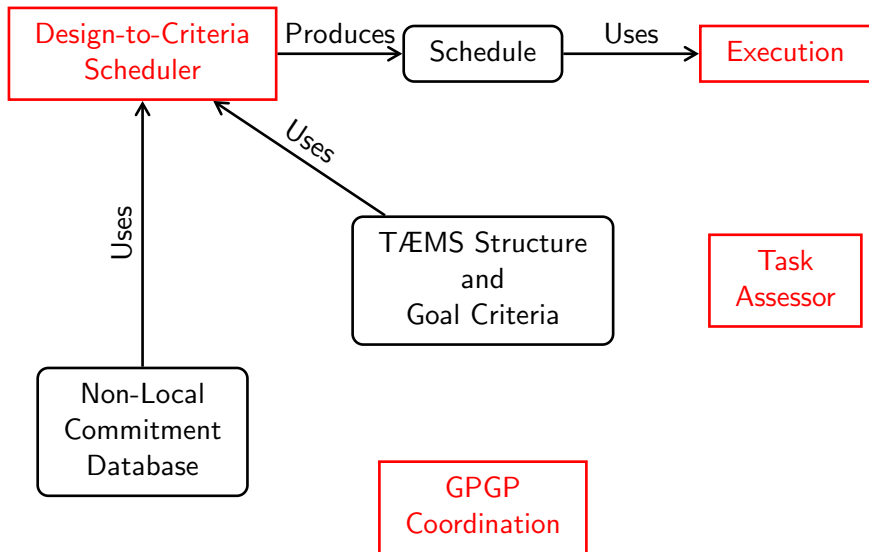
GPGP  
Coordination

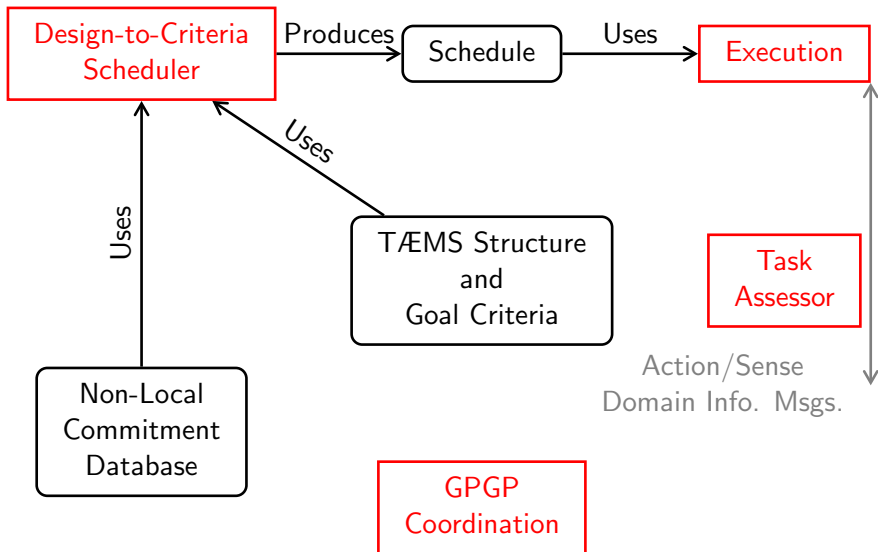


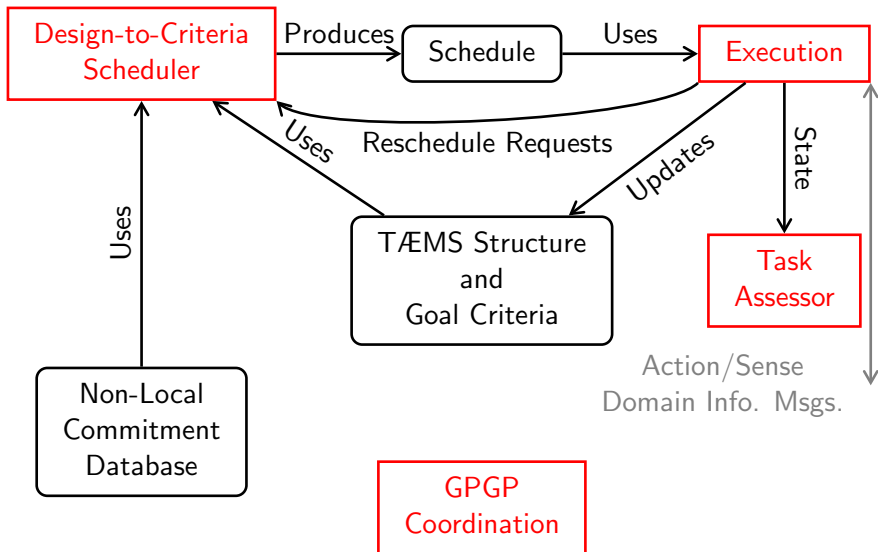


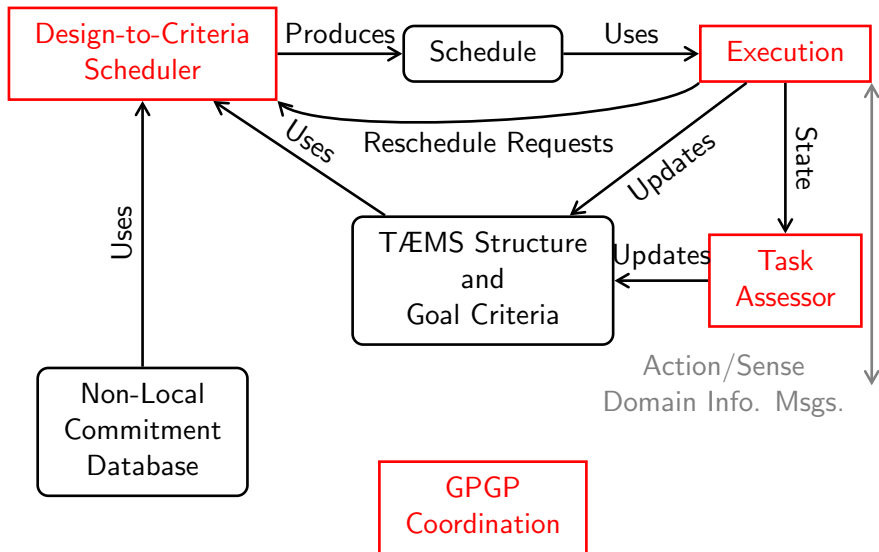


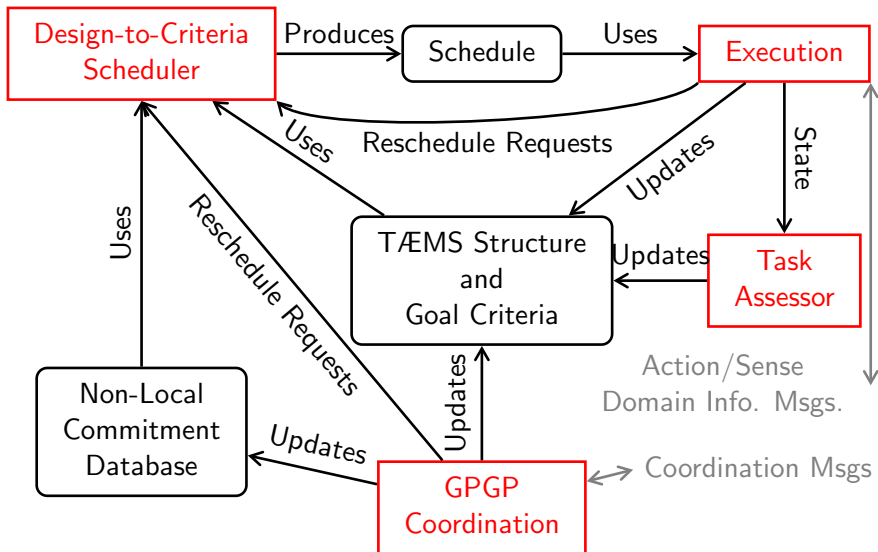






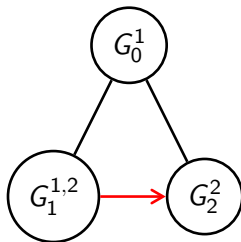




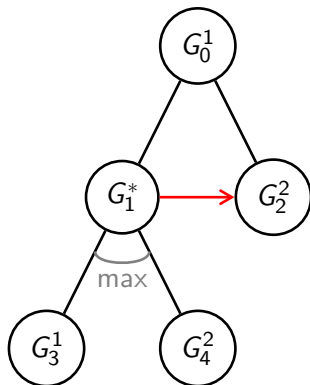




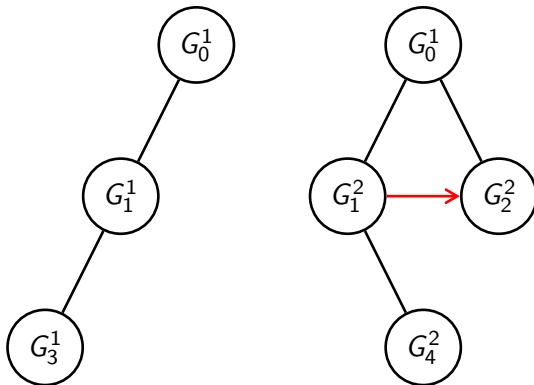
# Coordination Relationships



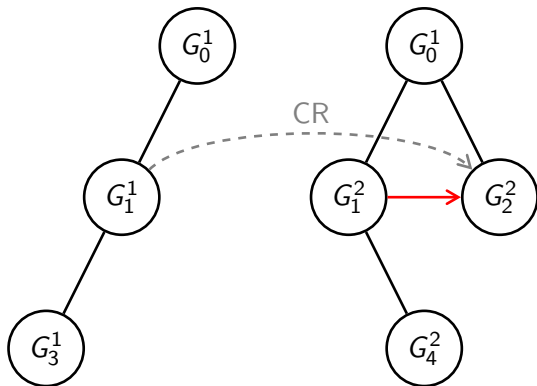
# Coordination Relationships



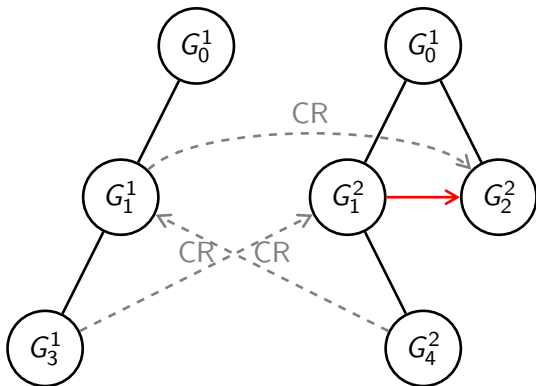
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# CR Reasons

- A non-local effect in the original graph now starts in one graph and ends in another, or
- a non-local effect or a subtask relationship has one end in one subgraph but the other end in both subgraphs.

## Commitment Messages: from 1 to 2

- Commit (**Do**( $G_1$ ))
- Commit (**Do**( $G_3$ ))

# Design-to-Criteria

- Uses search and heuristics. Complex.
- Needs to create schedules for the coordination module: what if? scenarios.
- Must find best schedule if many are possible.



# Key Concepts

- Coordination as distributed optimization—quantitative view of coordination.

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- Family of coordination mechanism for situation-specific control.
- Domain-independent representation of agent tasks, using TÆMS.
- Quantitative coordination relationships among tasks.
- Multiple goals of varying worth. Different deadlines and alternative ways of being solved.
- Modular interface between local agent control (planning and scheduling) and coordination mechanisms.