Composition of dynamical systems

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An http request

↓Request: http://paths.lids.mit.edu/

TCP: start timer
connect to paths.lids.mit.edu
timeout
start timer
connect to paths.lids.mit.edu
timeout
start timer
connect to paths.lids.mit.edu
timeout

↑Response: paths.lids.mit.edu
unreachable. Try again?

Failure to fulfill request leads to notification
and rollback of state.
Getting to LIDS

Find LIDS

Request: Find LIDS

Found LIDS

Response: Found LIDS
   Go straight
   Turn right 100 yds
   No signal  Start timer
   No signal

Failure to fulfill request leads to notification.

But there is no possibility of rollback

You are on your own!
Composition of dynamical systems

Route planner

GPS/mapping

Driver

Recourse 1

Recourse 2

Recourse 3

Error check

Maneuver

Turn right

Driver

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Questions

• Should coordination of physical systems specify they jointly meet a sequence of state-time constraints?
• Since it may not be possible to roll back to some start state if the constraint is not met, should coordination design include recourse strategies?
• What architecture framework can provide performance guarantees?

• These questions grew out of conversations with Sanjoy Mitter ten years ago!