PhysiCloud: A Cloud-computing Platform for Cyber-physical Systems

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Project Goals

- Develop light-weight cloud-computing platform
- Eliminate networking complexities
- Allow student use (better point)

Personnel

A collaborative effort among faculty and students at York College of Pennsylvania:

Faculty
Patrick J. Martin - CPS cloud computing

Undergraduate Students
Travis Eichelberger
Paul Glotfelter
Samuel Nelson

Future Work

- Hybrid centralized/decentralized optimization, coordination, and control design using the PhysiCloud architecture
- Development of GUI
- Cross-platform/language operability

Acknowledgements

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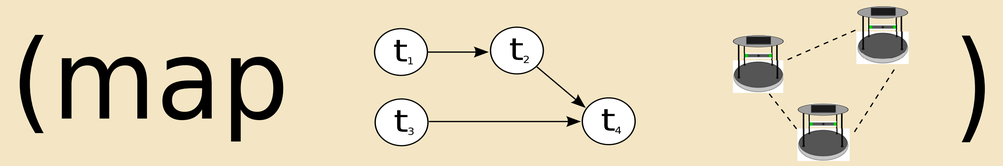
Project Results

Framework

PhysiCloud is a cyber-physical, cloud-computing infrastructure.

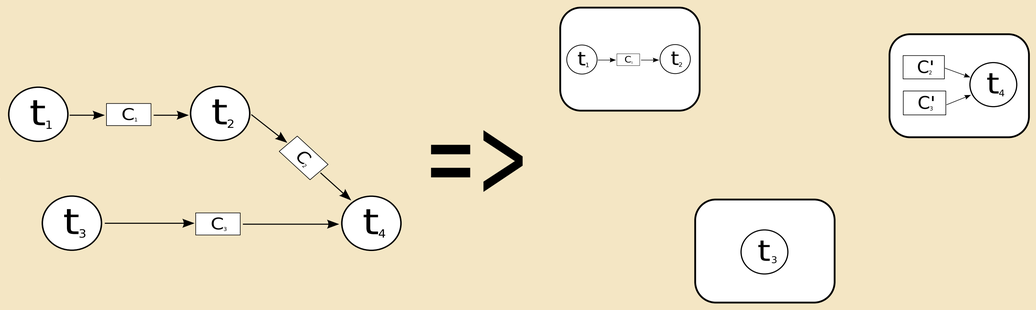
- Enables cloud-computing on low-power, mobile systems.
- Facilitates simple access to cyber-physical resources.
- Provides resiliency to network and power failures.



Tasks

To facilitate the programming of an application, PhysiCloud provides a task and channel interface based on Communicating Sequential Processes (CSP).

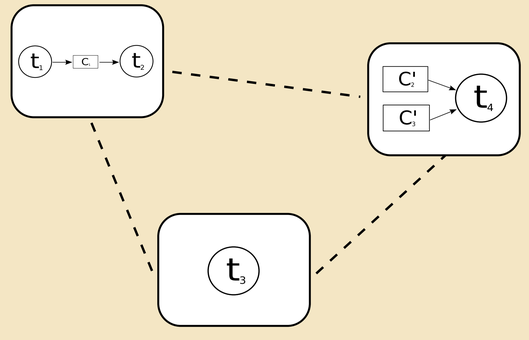
- Clarifies data-flow of application
- Allows distribution of tasks
- Most control applications can be easily modelled by CSP



Network Topology Construction

PhysiCloud constructs a network topology such that all dependencies are satisfied. This result is achieved by a two-phase process.

- Clarifies data-flow of application
- Allows distribution of tasks
- Most control applications can be easily modelled by CSP



The Monitor establishes TCP connections to each of the units and routes data appropriately.

- Enables
- Allows distribution of tasks
- Most control applications can be easily modelled by CSP