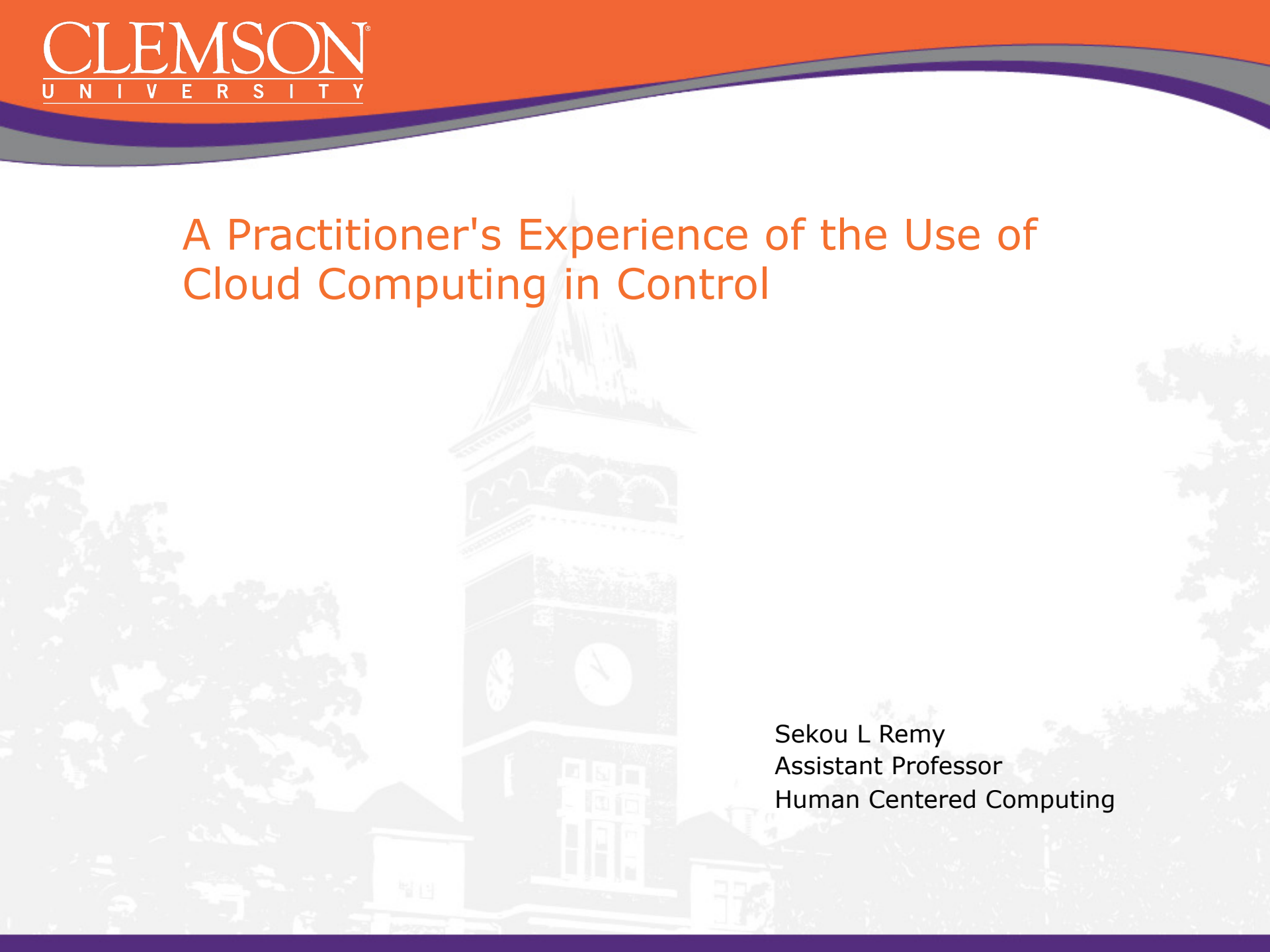
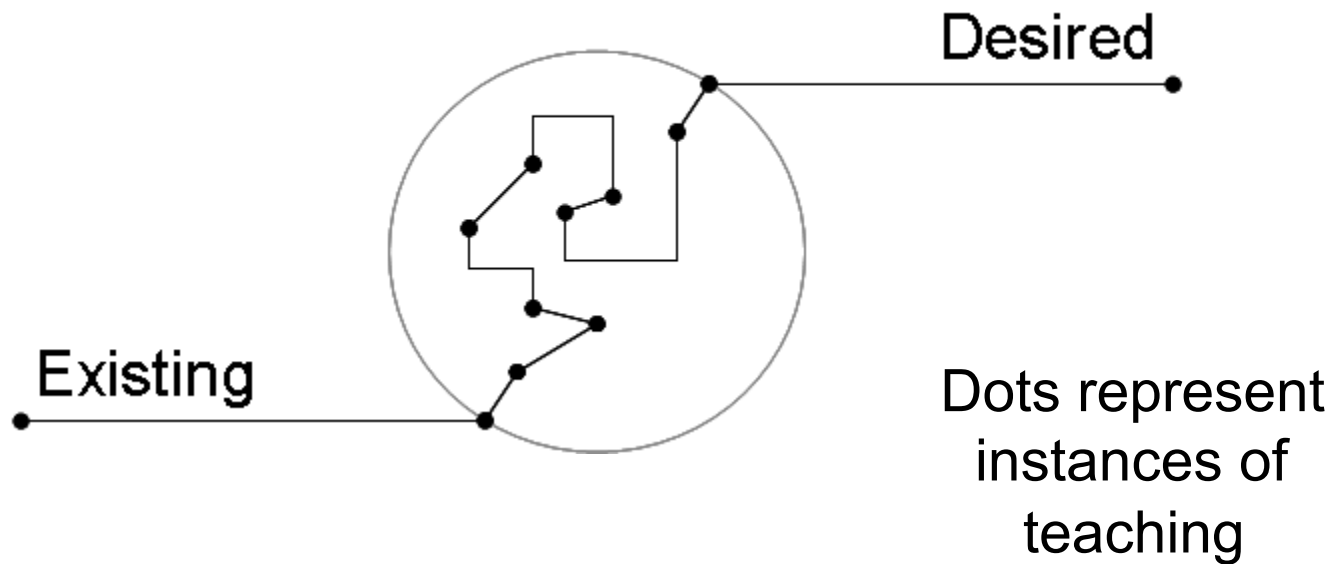


A Practitioner's Experience of the Use of Cloud Computing in Control

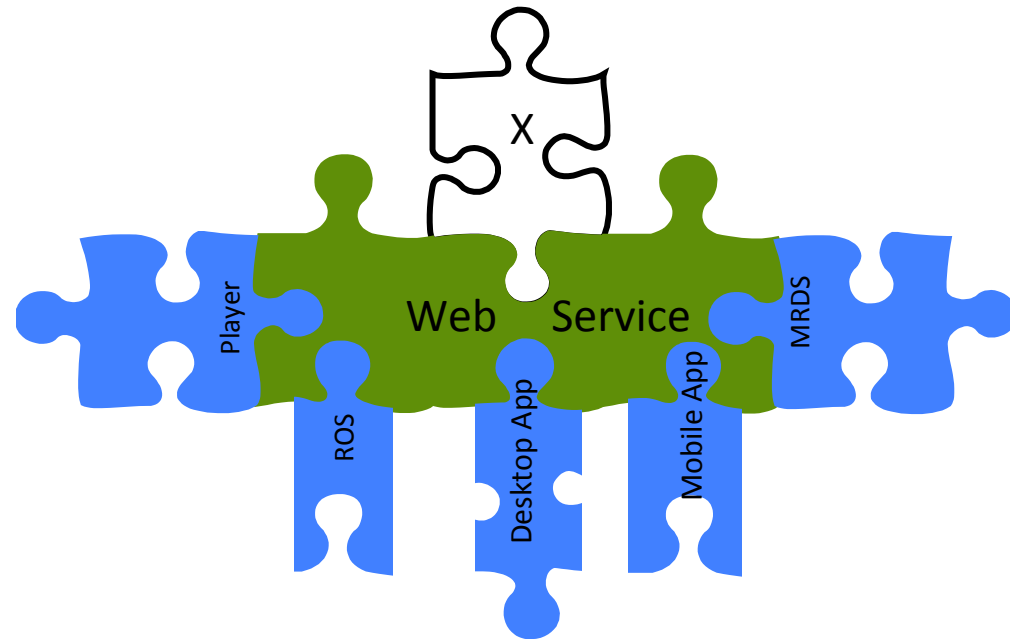
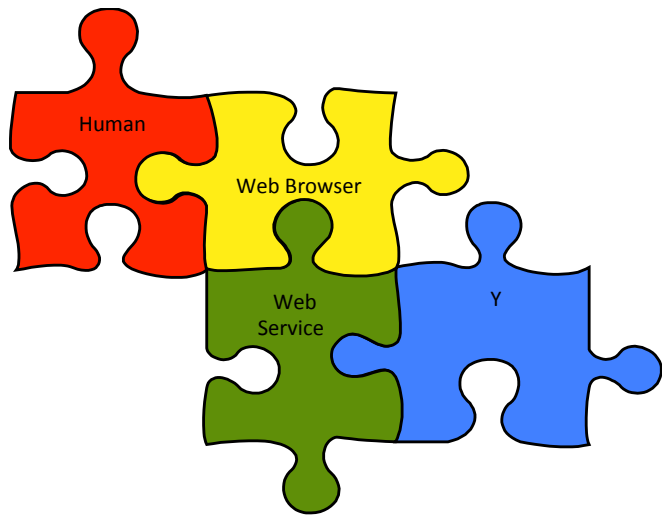


Sekou L Remy
Assistant Professor
Human Centered Computing

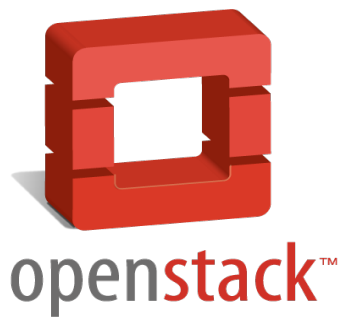
Championing learning from examples



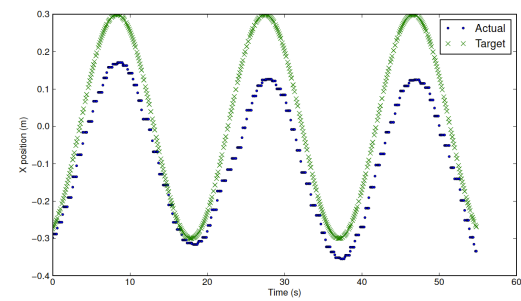
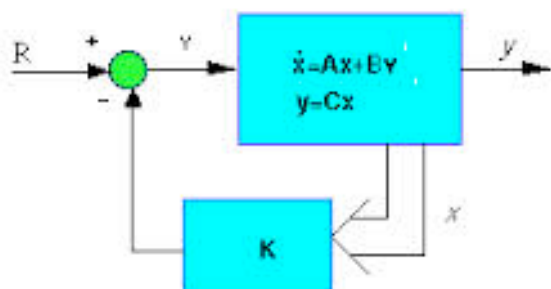
Championing the use of web standards



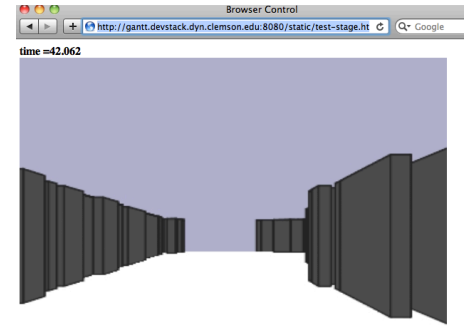
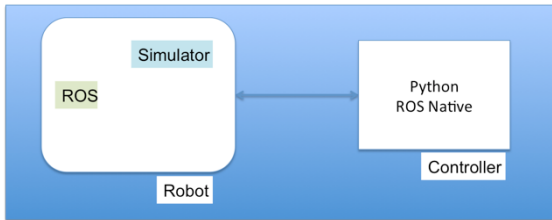
Tools in use



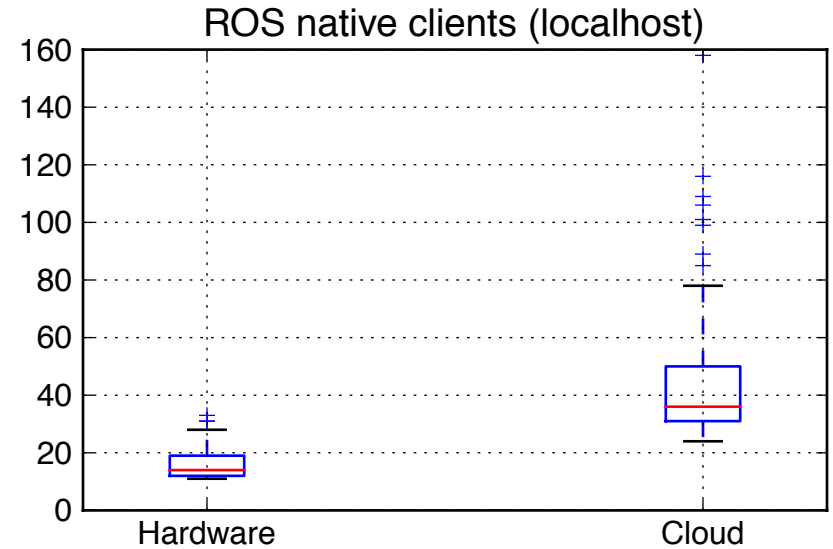
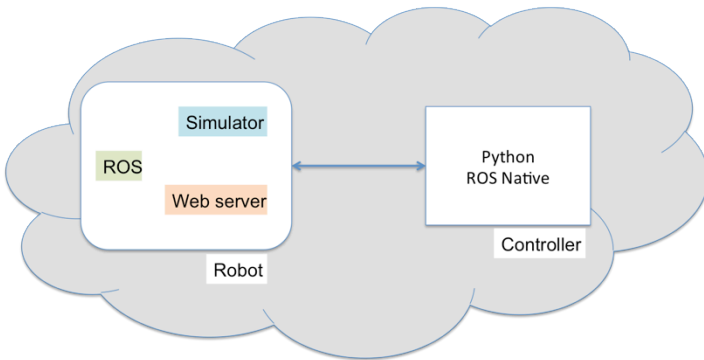
Closed loop control (stable)



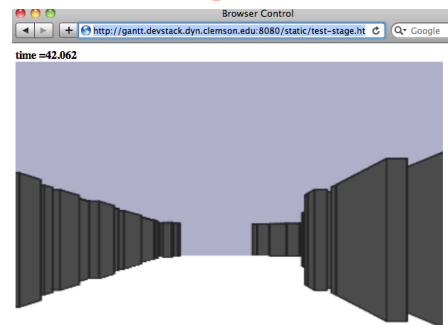
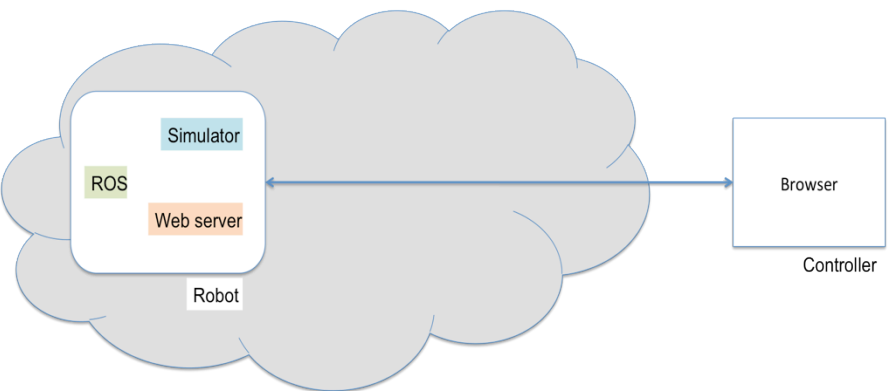
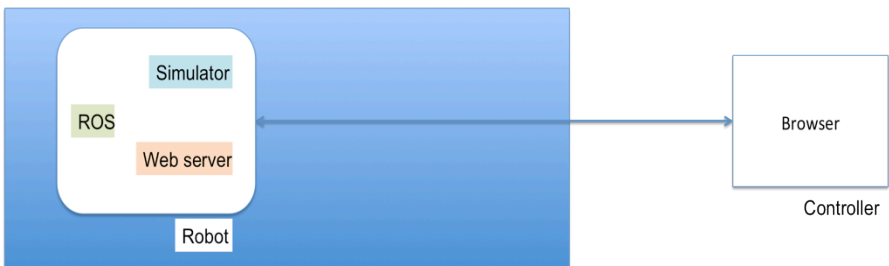
Impact of the IaaS (no network)



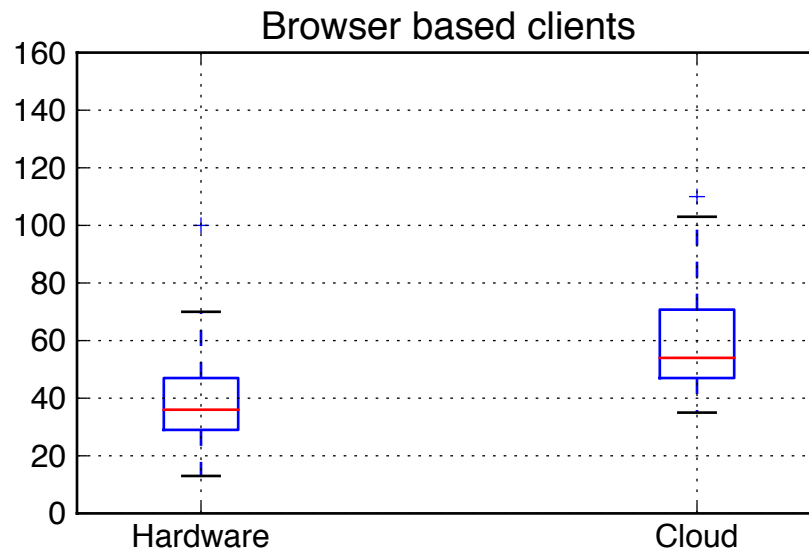
http://gantt.devstack.dyn.clemson.edu:8081/stream?topic=robot_0/image?width=600&height=quality=100 <- mpjpg stream



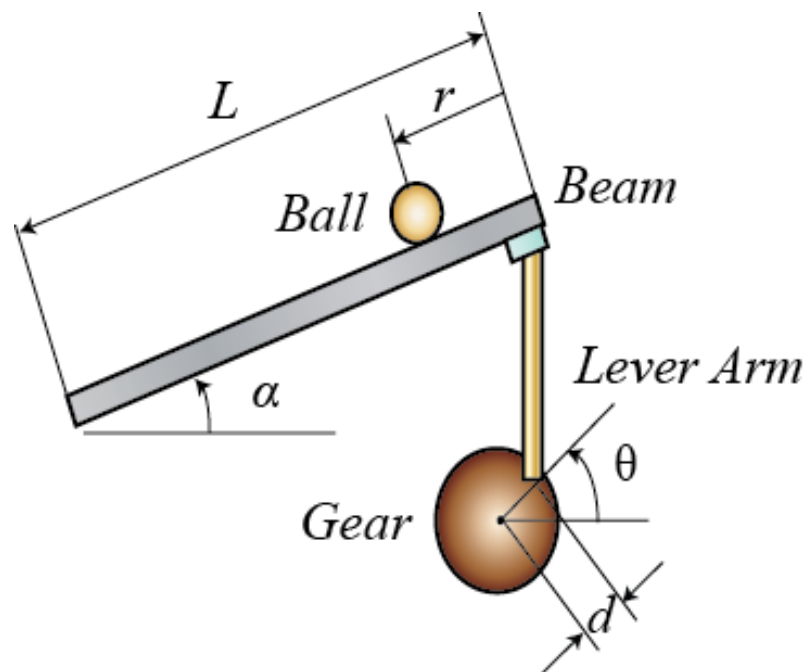
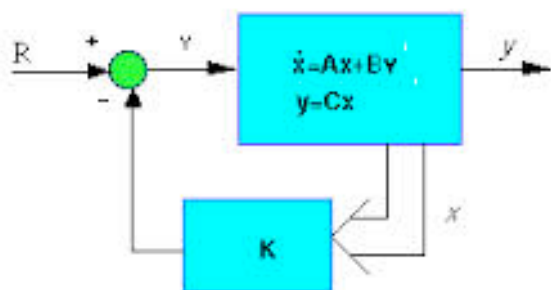
Impact of the IaaS (w/ network)



http://gantt.devstack.dyn.clemson.edu:8081/stream?topic=robot_0/image?width=600?height=quality=100 <- mpjpg stream



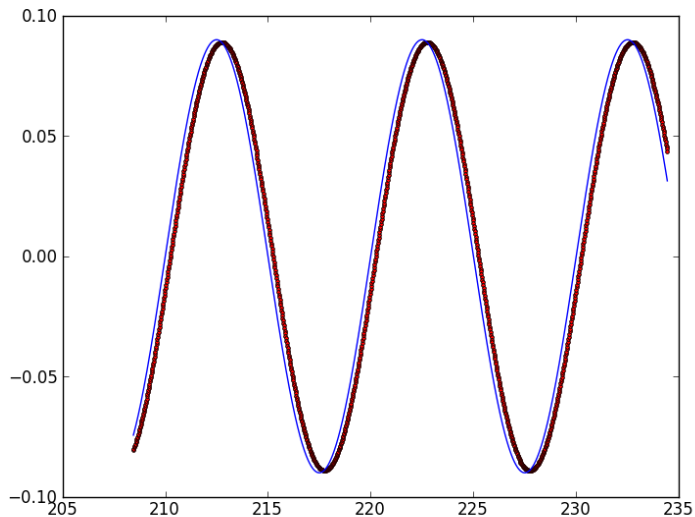
Closed loop control (unstable system)



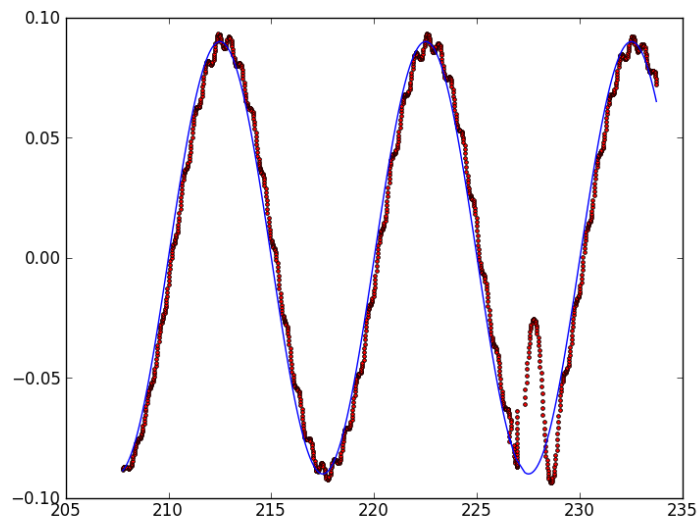
Closed loop control (unstable system)

The impact of network location is real, **but** there are developments coming!

Client on site

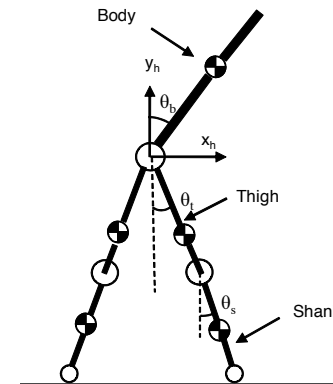
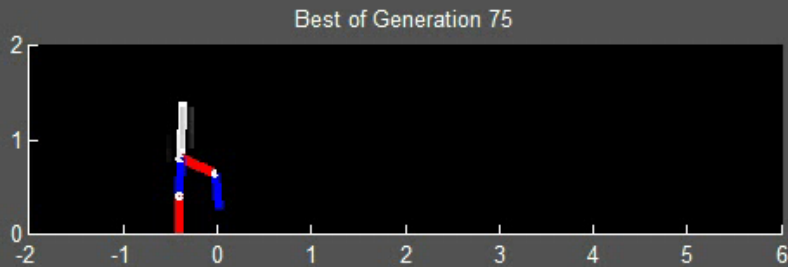
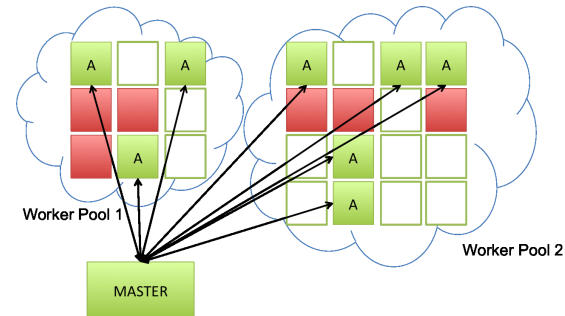


Client off site



"Off-line" use of cloud computation

Population based search for controllers



OpenNebula

Surprising pattern of failure in IaaS



hector_quadrotor simulation
Outdoor Scenario Demo

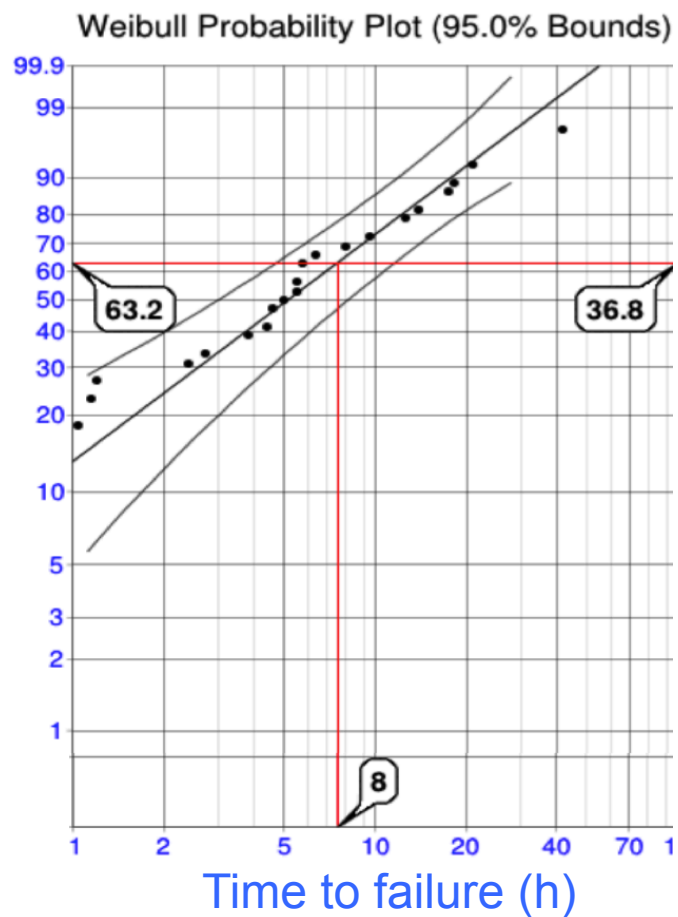
http://www.ros.org/wiki/hector_quadrotor



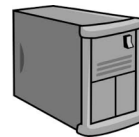
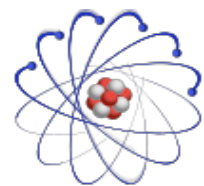
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DARMSTADT

Using the package shared by researchers, but running on Openstack

Surprising pattern of failure in IaaS



The ecosystem of things that can affect performance



In summary...

Lots of choices!
Lots of opportunity to fail/succeed
We need help from other communities

Is software defined networking (SDN) really the panacea to latency?



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hcc

Questions?