Programming the Cloud: From Zero to Hundred for Non-Programmers

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Future Grid

Objective

- Demonstrate that it is possible to have someone with zero knowledge in programming and cloud computing to use the cloud after 7 weeks and manage hundreds of virtual machines

- Provide educational material to assist students to quickly gain access to clouds and cloud computing

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Week	Goals	Planned Outcomes
Week 1	Learn Python	Knowledge about lists, arrays, strings, if, for
Week 2	Learn Python What is a cloud	Learn classes Define clouds
Week 3	Interface with the cloud	learn python sh, get access to a cloud, program to start vms and stop vms via sh
Week 4*	Collaborative Research environment	Communication of research results in paper and presentation, Working with a team to do code improvements Value of experts and when to contact them vs finding answers yourself Repeat all things learned so far
Week 5&6*	Fun WebGUI	develop a nice Webui to display the status of my VMs in an HTML table using Cloudmesh Do more advanced projects when done, such as displaying a graph with the times my vms are running.
Week 7	Report	Write a high quality technical report with bibliography about what was achieved. Cleanup the examples and make them available in github Provide a small introduction based on students point of view. Prepare a presentation summarizing the report

Cloud Computing

NIST defines cloud computing as:

> *"Cloud computing relies on sharing of resources to achieve coherence and economies of scale similar to a utility (like the electricity grid) over a network.[1]"*

You are probably using today cloud services:

> *Applications: google, google mail, apple maps, ...*

Just as you do not see what infrastructure produces power, you do not see on which of the many computers your services run.

Why Programming the Cloud?

Scientists we work with need hundreds of resources. The cloud can provide them, but they need to manage them. We want to demonstrate how a scientist can do this easily.

Tools must be made available to manage and program the cloud so that the users can be offered a seamless experience and do have convenient programmatic access to the cloud.

Pseudo Code

```
for i in [0,100]:
    ids[i] = create a virtual machine

for i in ids (eg. for all ids):
    create an entry in html table with its status

for i in ids:
    delete the machine(i)
```

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Status and Achievements

- General
  - Devised timeline
  - Developed test programs
- Todo
  - Finalizing programs
  - Developing html table program
  - Making programs nicer
  - Documentation
  - Report
  - Presentation
  - Identify limitations
- Personal
  - 80% in programming test
  - Understanding how to do research
  - Getting lots of help from mentor
- Todo
  - Improve python knowledge
  - Do more progress in programming
  - Identify technical challanges

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