

Parallel computing using Amazon Web Servies

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Abstract

This simulation is an analysis of river flow all around four pillars of the bridge. To simulate the flow process OpenFoam has been used.

1. Introduction

The main aim of the project was to learn how to use Amazon Web Services and provide certain changes of the code to make computing parallel.

2. Details

2.1 Instance description

As an OpenFoam simulation I chose CFD Direct From the Cloud running OpenFoam 4.1 on Ubuntu 16.04 LTS Amazon Machine Image (AMI). An AMI is a template that contains the software configuration required to launch intance.

2.2 Terminal description

To connect to my AWS Instance I used Putty emulator. Putty is a free and open-source terminal emulator written for Microsoft Windows and it supports SSH protocol. To connect to my instance I needed also PuttyGen. The program was used to convert a key from .pen to .ppk.

2.3 Case

Code was upload straight from the computer. It could not be done from github service due to mesh file size that exceeds the permissible one. Most of the commands, like uploading to the instance, was found on user's forums and verified if correct by the result. The code is based on OpenFoam Tutorial [1]. The quadratic channel is equiped with four obstacles representing four pillars of the bridge. The outcome of the simulation are two pictures visualising velocity and pressure of the river flowing all around the obstacles.

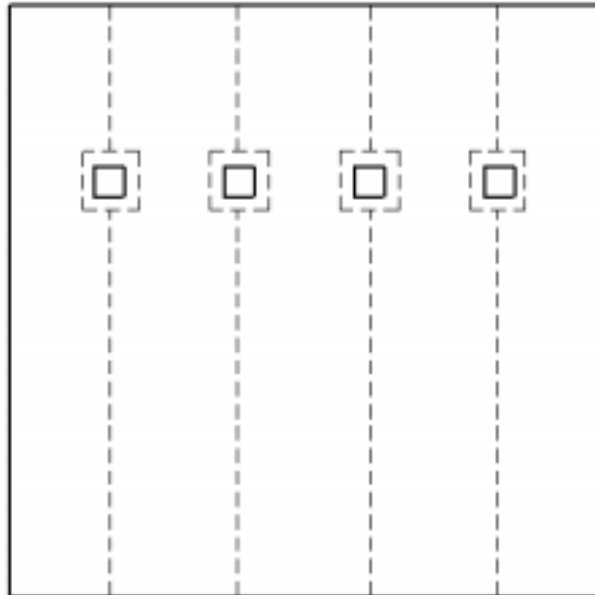


Image 1 Distribution of pillars

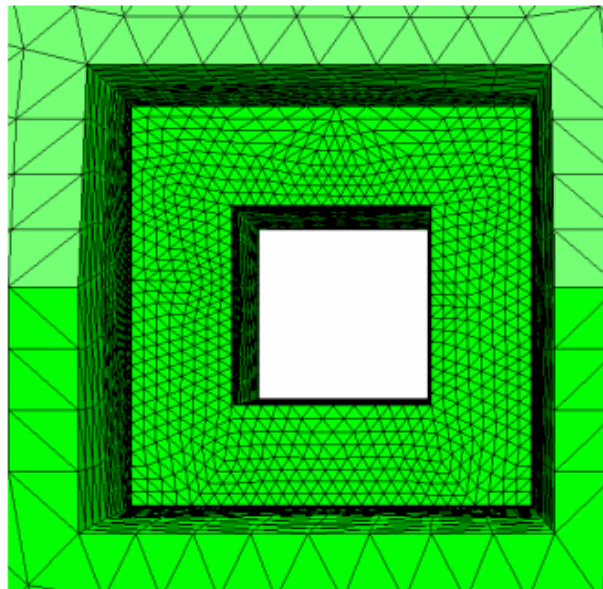


Image 2 Pillar detail mesh

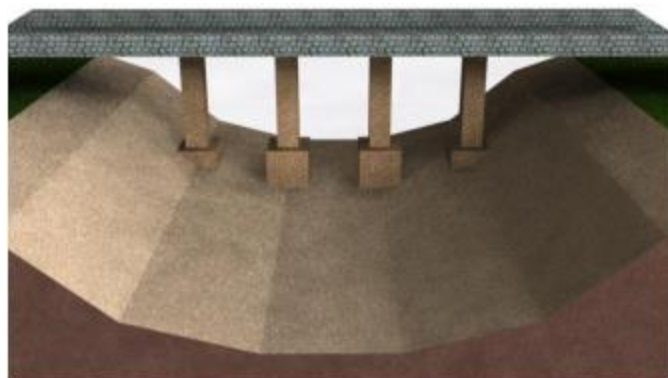
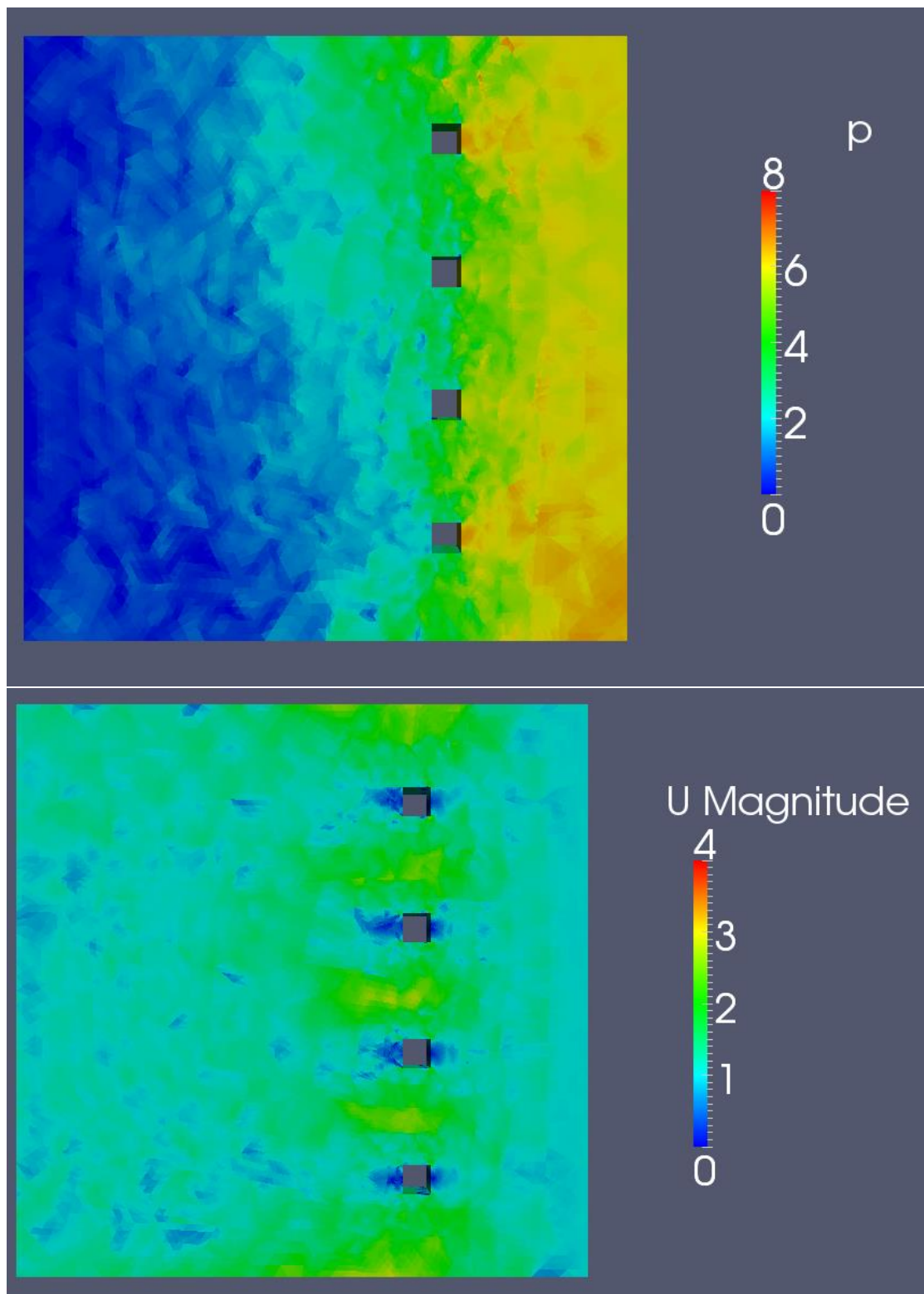


Image 3 Front view

3. Results



4. References

[1] „Simple beginning 3D OpenFoam Tutorial” by Sebastian Rodriguez from www.libremechanics.com