AMAZON EC2 SPOT INSTANCE INTEGRATION

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Project Description
The purpose of this project is to bring support for Amazon Elastic Compute Cloud (EC2) Spot instances to the popular continuous integration server, Jenkins. The team is extending the functionality of the existing EC2 plugin for Jenkins, which supports On-Demand instances, to also support the use of Spot instances.

AWS EC2 and Spot
An EC2 instance is a virtual computer that users rent on a per hour basis for computations “in the cloud”. Spot instances are a form of EC2 instance in which users can pay a significantly reduced cost for the instance. Users specify the amount they are willing to pay. If the bid exceeds the going rate for the instance then they are able to use the instance. If the going rate exceeds the user’s maximum bid, the instance is terminated without warning.

Deployment View

Jenkins
Jenkins is a tool that provides developers with a means to run automated processes on a schedule or after certain events. The job might fetch the latest code from a repository, build the project, and run the unit tests to ensure that the newly submitted code did not create any issues. Jenkins can be configured to send out notifications in the instance that something does break.

Sponsor Goals
Enable distributed computing frameworks to work with Spot instances.
Allocate some of the difficulties associated with Spot instances
Demonstrate to potential users the cost saving benefits of using Spot, and how those benefits outweigh any risk involved.
Ensure customer use and continued development of the project by merging our solution with the framework’s mainline.

How it Works
Once the plugin is installed users must go through a series of steps to ensure proper configuration of their environment:
A. Configure Amazon Machine Image (AMI) with necessary scripts for registering with Jenkins.
B. Configure an Amazon Cloud on Jenkins.
C. Configure a node that uses the previous AMI, mark it as a Spot instance, and provide a max bid price.

After the configuration of the Jenkins environment is complete you may provision a Spot node from the user interface (1). If the max bid price you specified is higher than the current market price, your Spot instance will be fulfilled (2). Once the Spot instance is fulfilled, it will use the scripts provided previously and register itself with the master Jenkins server (3). After the registration process is complete, the Jenkins server is able to distribute work to the Spot instance as needed (4).

If the Spot instance goes down due to an increase in market price, any job running on the node will be lost. To help counter this situation, the team built a separate plugin that allows jobs to be configured to requeue if the node they are running on goes down.

Process
The agile Scrum methodology was chosen for completing the project because of its high adaptability to changing requirements.
Scrum provided a lot of visibility to our sponsor through demos and deliverables which ensured that the project was meeting its goals.
To facilitate our use of the Scrum methodology the team used the project management tool Redmine. This tool assisted in the organization of Scrum artifacts and metrics for the project.

Technologies

Process Metrics
Task Estimation
Sprint Velocity

Estimation accuracy improved over time; however, there were sprints where the estimation accuracy was heavily impacted by the occurrence of unexpected risks.

When determining the amount of work to be done in a sprint external obligations as well as RIT’s recess schedule were considered.