Lecture 2: IaaS Cloud and Amazon EC2

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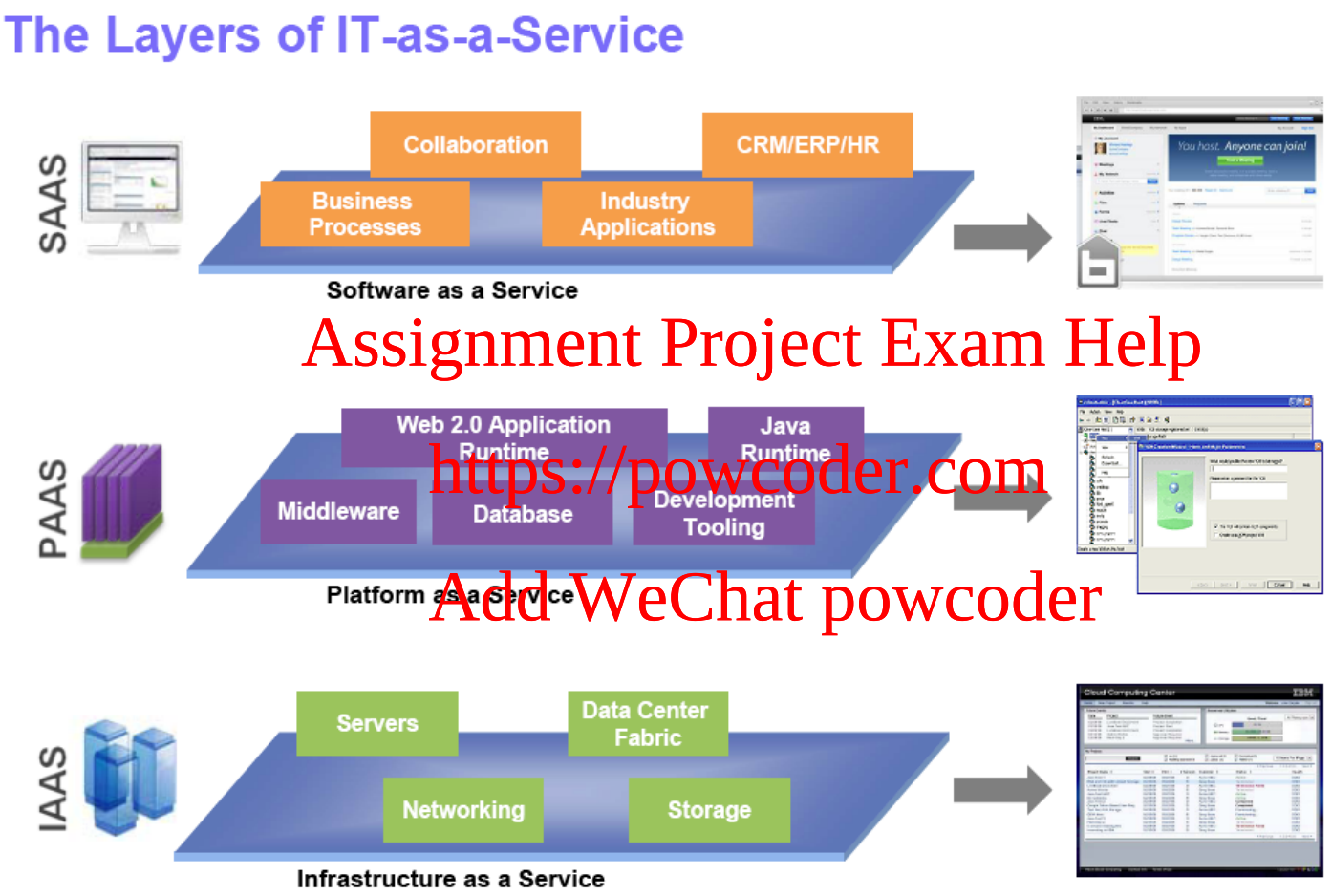
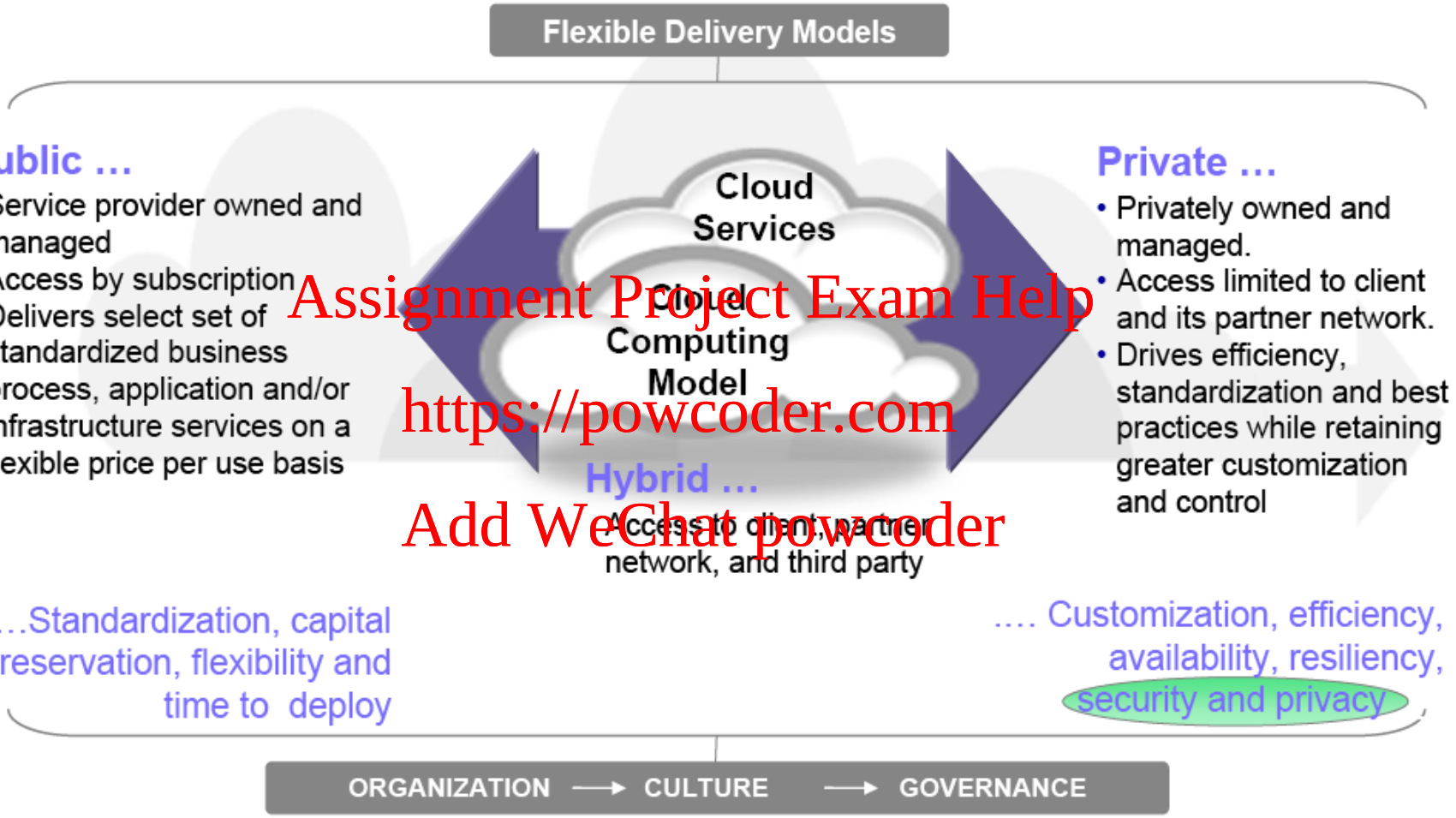
Recap from Lecture 1

Different Cloud Offerings: A Layered Perspective

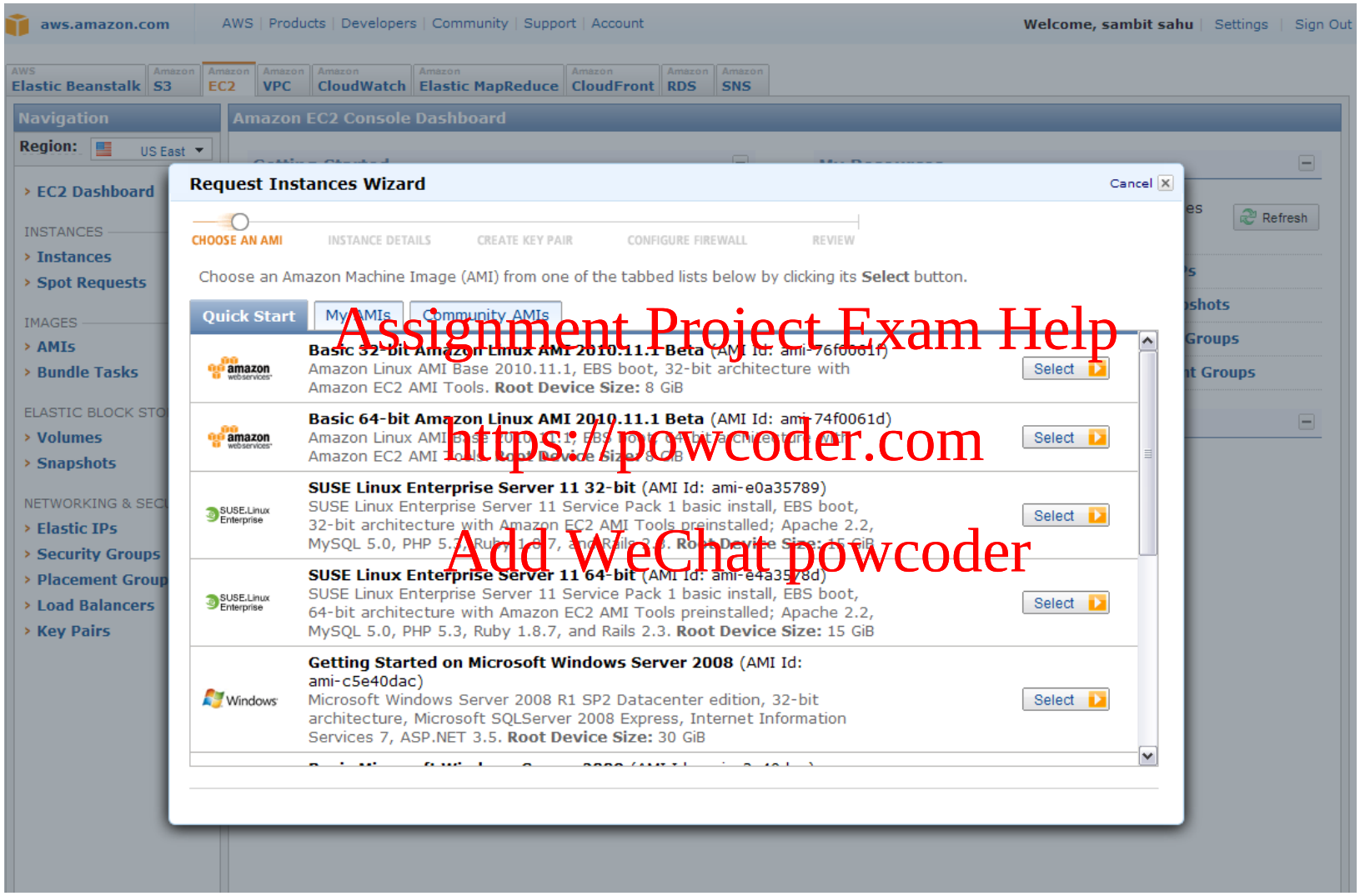


- Higher the stack, less control but more automation for user
- Lower the stack, more control but more responsibility for user

Cloud Computing Delivery Models

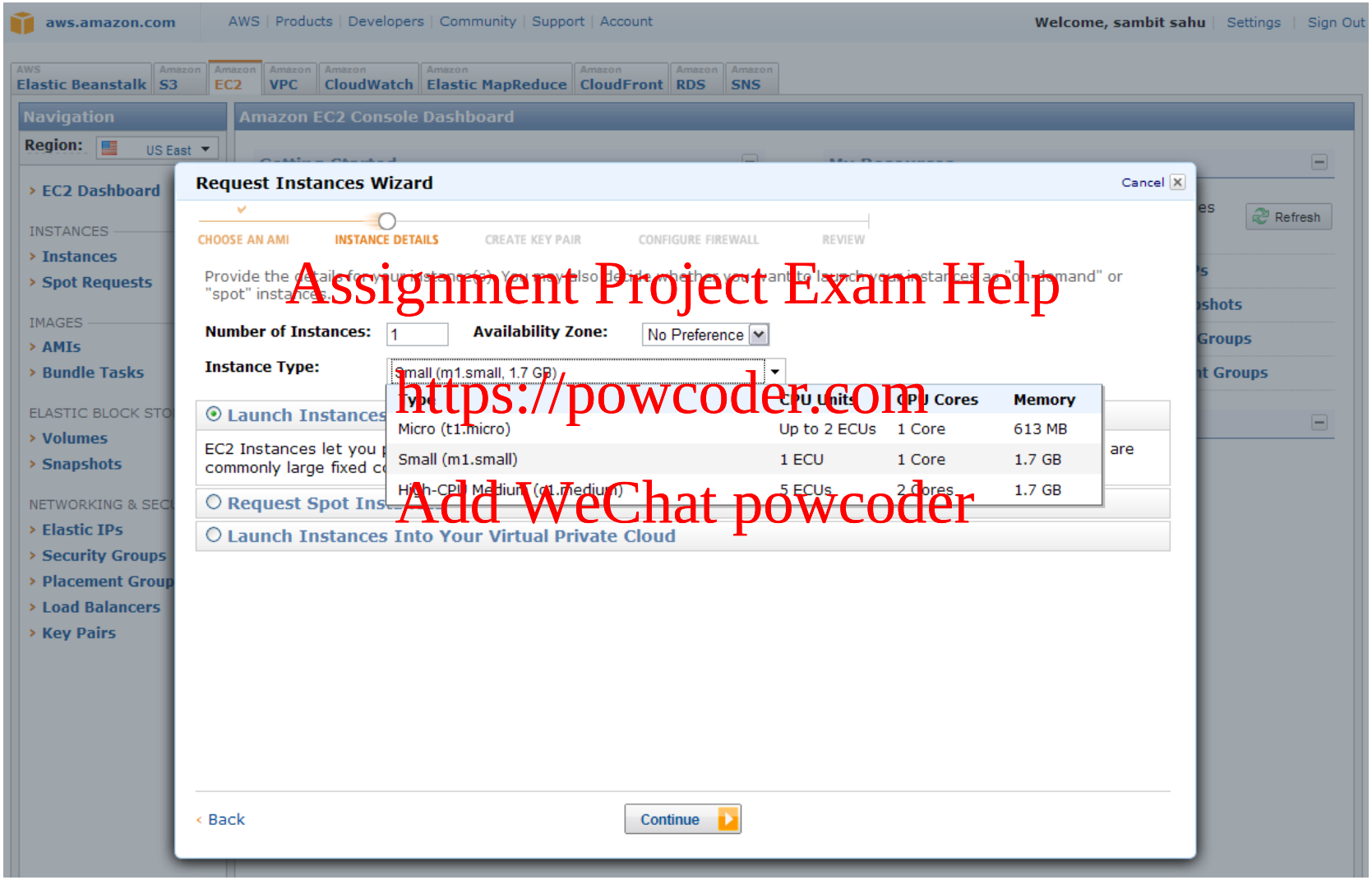


User launches request instance → a list of prebuilt stack is provided



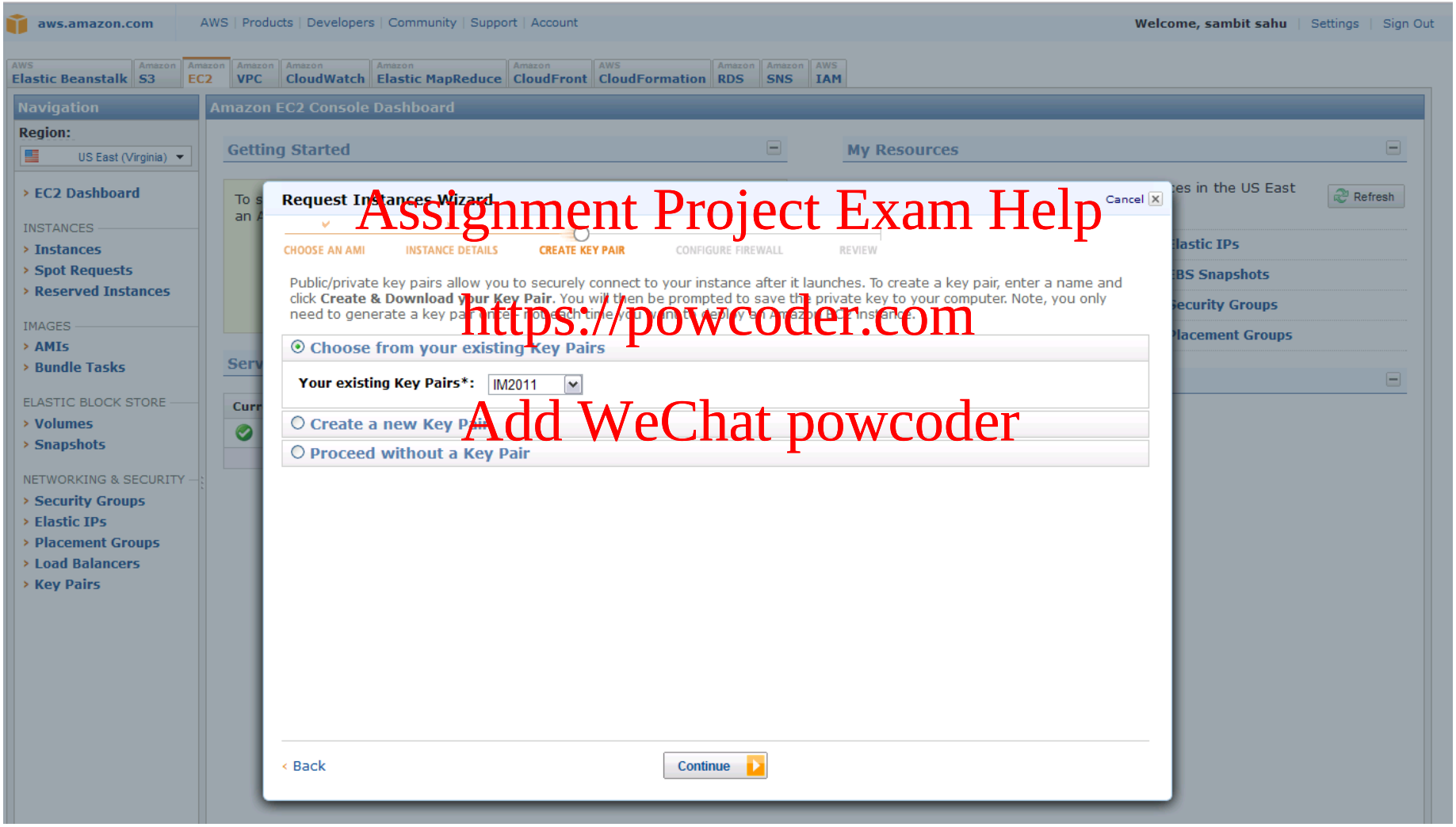
- AWS shows a list of available pre-built base software stack (**called Virtual Appliances**) user may request to add to the machine

User can choose the resource size (CPU, mem choices)

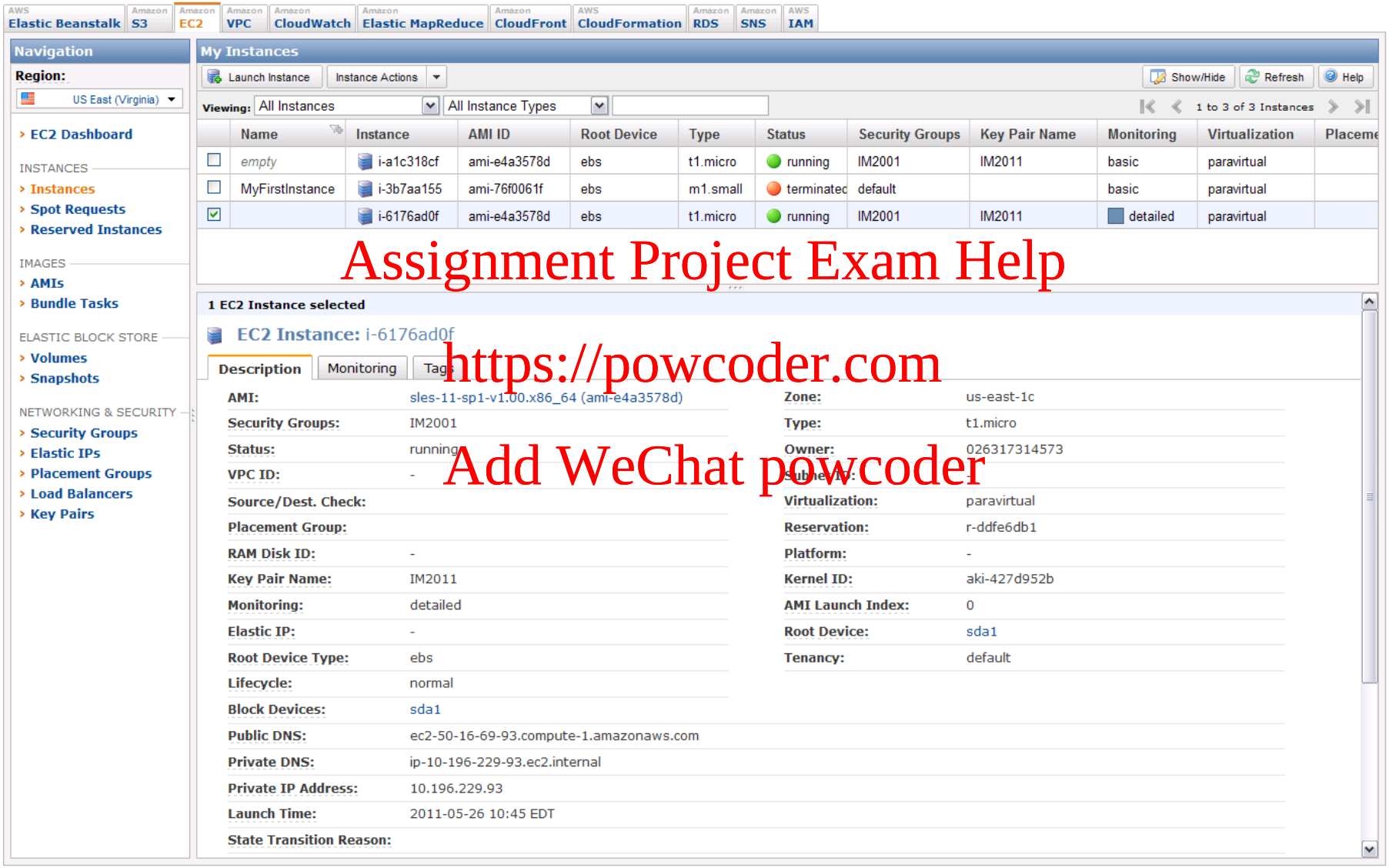


- Instance request wizard guides through resource choices

User specifies security/access configurations



AWS provisions an instance and returns user credentials



This week: IaaS Cloud and Amazon EC2

- API and CLI based access
  - http://docs.aws.amazon.com/cli/latest/userguide/cli-chap-welcome.html
- AWS access using Java SDK and CLI
- Learn how to use EC2 and S3 as example services
- Breaking down the steps - how AWS provided on-demand resource
- Create a web server and deploy your web application using AWS
- How to use on-demand infrastructure for regular applications?

AWS CLI

CLI Setup

- Allows you to interact with AWS Services/APIs using command line
- Install AWS CLI on your machine
  - Mac OS example: https://docs.aws.amazon.com/cli/latest/userguide/cli-chap-install.html

Examples

- Create an AWS instance using CLI: https://docs.aws.amazon.com/cli/latest/userguide/cli-chap-tutorial.html

- S3 for backup: https://aws.amazon.com/getting-started/tutorials/backup-to-s3-cli/

Deploy Web App

- https://docs.aws.amazon.com/gettingstarted/latest/deploy/awsgsg-deploy.pdf
- Services you will use
  - Elastic Bean Stalk
  - DynamoDB
  - SNS
  - IAM
  - Node app

Amazon EC2 Programming

- Amazon EC2 SDK for java on Eclipse
  - https://docs.aws.amazon.com/toolkit-for-eclipse/v1/user-guide/setup-install.html
  - http://aws.amazon.com/eclipse/
  - A simple tutorial http://media.amazonwebservices.com/videos/eclipse-java-sdk-video.html

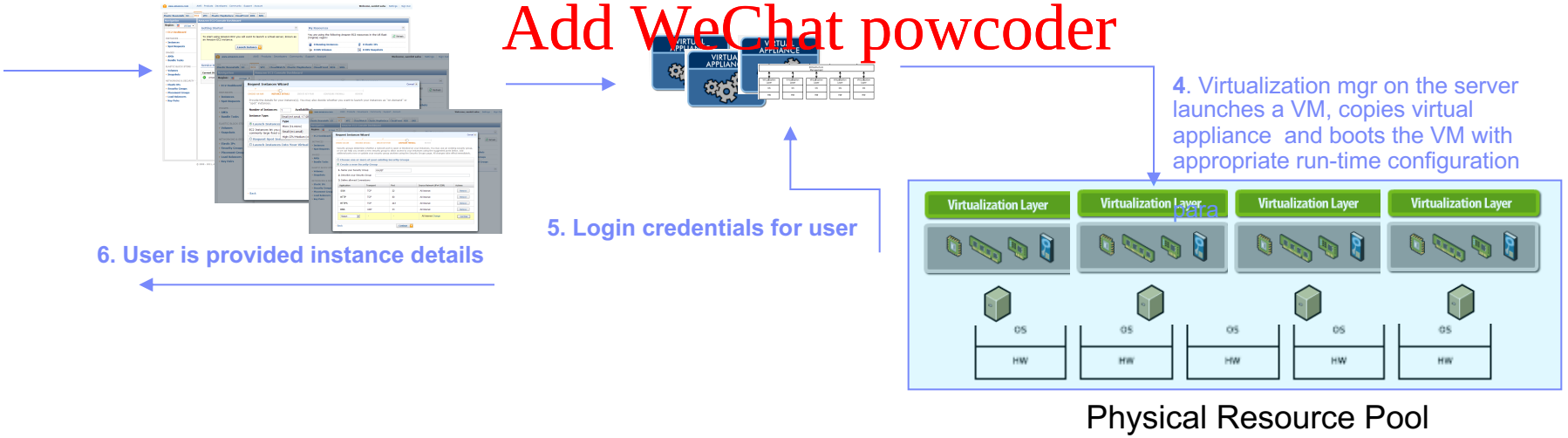
- AWS Python SDK: Boto3
  - https://boto3.amazonaws.com/v1/documentation/api/latest/guide/quickstart.html

Reference Material

- Installing AWS SDK on Eclipse
  http://d36cz9buwru1tt.cloudfront.net/videos/eclipse-java-sdk-video.html
- Amazon Elastic Compute Cloud (EC2) Getting Started Guide
- Amazon Elastic Compute Cloud (EC2) User Guide
- Programming Amazon EC2

Deconstructing Amazon EC2 request machine API

- User goes to Amazon EC2 portal and specifies desired parameters for a machine
  - Resource: CPU, mem, disk
  - Stack: OS and possibly with additional software
- Amazon AWS Cloud manager (resource pool manager) provisions the user request
  - Finds appropriate physical resource
  - Dispatches the request to virtualization manager on the identified resource
  - Cloud Manager invokes EC2 API to provisions the request
- Virtualization manager on physical server
  - Copies the pre-built software stack (virtual appliance)
  - Provisions a guest VM and configures parameters (IP address, access rules,…) at run/boot time
- Cloud manager returns login credentials to user



Papers for Next Week

- Reading List:
  - Google File System (GSF): https://static.googleusercontent.com/media/research.google.com/en//archive/gfs-sosp2003.pdf
- Reference Materials
  - AWS in Action Chapter 3-6