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Migrating IBM Maximo to the AWS Cloud
Instructional Systems Design

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Name	Role	Contributions
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I. Desired Results and Needs Analysis

I-A. Statement of Instructional Problem

Instructional Problem: In 2013, EAGLE Inc. (North America), a manufacturing company, went live with an enterprise asset management application called IBM Maximo. In addition to asset management, Eagle Inc. uses IBM Maximo for facilities maintenance. Last year, Eagle Inc.'s IT Department passed an initiative to deploy all future enterprise applications from 'On Prim' to Amazon Web Services Cloud, also known as AWS EC2. In addition, all existing enterprise applications including IBM Maximo hosted at Eagle's data center will be migrated to AWS EC2.

Eagle Inc. outsources IBM Maximo support to Oxy Services, an IT Consulting firm. Oxy offered Eagle Inc. a quote of $100,000 to migrate IBM Maximo to AWS. This is not within Eagle Inc's budget. Instead of outsourcing the project to an IT Consultant, Eagle Inc. will pay for training of their IT Support team to learn how to migrate IBM Maximo to AWS EC2.

I-B. Broad Goals and Deliverables

CosperSoft Consulting will provide training services to Eagle Inc's IT staff on migrating IBM Maximo to AWS EC2.

The overall training program goals:

1. Lecture: AWS EC2 Instance Types overview and recommendations.

2. Lecture & Documentation: How to migrate IBM Maximo to an AWS cloud Instance, step-by-step document, intended audience is Eagle's IT department.

3. Video demonstration:

    a. Analyze the migration steps of IBM Maximo to an AWS EC2 Instance.
    b. Demonstrate launching an EC2 Instance aligned with IBM Maximo system requirements.
    c. Demonstrate installing and configuring IBM Maximo on an EC2 Instance.

4. Documentation: Best practices for system administration of IBM Maximo.
5. COURSE LAB: Step-by-Step guide to launching AWS Instance and Installing IBM Maximo (See Appendix A3).

I-C. Needs Analysis

Eagle Inc participated in a Needs Analysis survey to find out what areas and to which positions the training should focus deepest on. Combined with a Gap Analysis (1-D) we are able to verify that there is a greater need to understand IBM Maximo's configuration over AWS EC2 training because Eagle Inc. already has skilled professionals supporting AWS Instances whereas with IBM Maximo, they outsource the support. Below is the Needs Analysis survey Eagle Inc. responded to.

Training Needs Assessment				
	No training need	Some training	High Training Need	Not Applicable to job
Creating EC2 Instance (s)				
Moving files/resources to S3 storage buckets				
Installing IBM Maximo/Websphere				
Migrating Data				
Security Overview				
AWS EC2 Best Practices				
IBM Maximo Best Practices				

Table 1: Training Needs Assessment given to Management.

What are you willing to pay for learning plans (per person)?

The procurators for the Maximo to AWS migration were surveyed to find out what they are willing to pay for training. The training is asynchronous and can be done anytime, but in total it equals a half day of instruction. The amount that a company pays for training yields greater returns in details and bonus features. The table below shows the survey.

Cost Per Learner					
	$100	$125	$150	$200	Not Price Sensitive
Half Day	Half Day $100	Half Day $125	Half Day $150	Half Day $200	Half Day Not Price Sensitive
One Day	One Day $100	One Day $125	One Day $150	One Day $200	One Day Not Price Sensitive

I-D. Gap Analysis:

A gap analysis shows the findings of the needs analysis stating the current state, desired future state, and strategies to bridge the difference. Based on this analysis it has been determined that training how to setup and configure the AWS EC2 instance(s) is not necessary. However, a gap exists in setting up and configuring IBM Maximo and Websphere; thus, the training will focus on it. Only a guide for best practices in supporting Maximo and Websphere on AWS will cover EC2 instances.

Skill	Current State	Desired State	Root Cause	Evidence of Root Cause	Outcomes
Webspere Installation Skills:	Staff has installed WebSphere but not configured it for Maximo	Staff configures WebSphere for Maximo	Outsource company installed and configured Maximo before.	Tasks outsourced to 3rd party	Demonstrate WebSphere configuration for Maximo
Maximo Installation Skills	Staff has not installed IBM Maximo	Staff will install IBM Maximo	Maximo was installed by vendor	Task outsourced to 3rd party	Demonstrate installation of IBM Maximo
Maximo Configuration Skills	Staff has not configured Maximo	Staff learns to configure Maximo	Configuration managed by vendor	Task outsourced to 3rd party	Demonstrate Maximo configuration steps.
AWS EC2 Configuration	Staff are advanced at configuring AWS EC2 instances.	Staff is competent	Staff has been configuring AWS instances for 3 years	Company already supports EC2 instances	No training necessary.

I-D. Learner Analysis

AWS and IBM skills are assessed by role. Participants are asked to self-assess by skill using the following knowledge and experience scale. AWS Instances are supported by IT Administrators whereas IBM Maximo is supported by systems administrators, database administrators, business analysts, and customizations are assigned to software developers. The other positions listed in the learner analysis have influence over management and support of IBM Maximo and AWS instances.

Category	Individual Contributor Role	Function
Software Developer	Application Architect	Design Software applications
	Software Engineer Quality Assurance	Develop / Test software applications
IT Infrastructure and Operations	IT Architect	Design IT Systems and Infrastructure
	IT Administrator	Build, deploy, and maintain IT Infrastructure
	Systems Administrator	Manage and support IT systems and infrastructure
DevOps	DevOps Engineer	Automate Code deployment and management process.
Analytics and Database	Analytics Engineer Data Architect	Design and implement systems that derive value.
	Database Administrator	Design and Maintain Databases
Security	Security Architect Governance Analyst	Design Security and Compliance of IT systems and architectures
Planning & PM	Business Analyst Project Manager	Analyze, define, and plan business requirements.
	Systems Analyst	Define and Management Requirements

Demographic Data

The data in the table above was collected via interviews and surveys. It describes the learner characteristics that must be considered in designing the proper instruction for the population. Some notable considerations: Everybody involved in the training is either technical or a technical manager capable of understanding technical terminology.

Demographics and Group Data	
Characteristics	Results
Size of target audience, and sub-groups within population	2 groups; one of IT managers, other of technical staff. Manager group size is 5 to 7, technical staff is 10.
Nature of group as a whole (diversity, ability spread, job assignments, etc.)	50% White, 25% Indian, 10% Asian, 15% Other
Age range	Ages range from 26 to 70.
Education level	All staff has at least a Bachelors degree, some graduate degrees.
Gender Percentages	70 male, 25% female, 5% other.
Cultural Backgrounds	Mix of diversity: mostly American Males, but 5 or 6 are offshore contractors.
Primary/Native language	English is spoken by all, but 10% English as a second language.
Occupation	5 IT Managers, 5 System Administrators, 5 network engineers, various others (DBA, Security, Support).

Implications for Design

The data in the table above was collected via interviews and surveys. It describes the learner characteristics that must be considered in designing the proper instruction for the population. Some notable considerations: Everybody involved in the training is either technical or a technical manager capable of understanding technical terminology.

The training CosperSoft LLC provides is designed for gender, national, age, and cultural neutrality. It's technical, so you must understand technical language. Because the training is designed specifically for Eagle Inc.'s IT environment, social considerations aren't necessary.

I-E Contextual Analysis

Instructional Context

The learning/instructional context for the offering will be completely online and asynchronous. This is due to differing schedules amongst staff who are mandatory learners of the offering. The learning will be self-paced. Because the training is a demonstration of how to perform a migration of Maximo to AWS EC2 and not the actual migration, there is not a deadline or a go-live date to perform the procedures in a production environment.

Performance Context

With the training being self-paced and asynchronous, the performance context will be in a development environment. The execution of the Maximo migration to AWS EC2 should be performed multiple times with documentation for precision so that in the Test and Production environments, the routine can be scripted with a DevOps mindset, which is a new cultural context for Eagle Inc.

Cultural Context

Eagle Inc.'s organizational/cultural context is built on an older pre-DevOps mindset whereby development and operations teams are completely separate. Transitioning to DevOps requires a change in culture and mindset. At its simplest, DevOps is about removing the barriers between two traditionally siloed teams, development and operations. In some organizations, there may not even be separate development and operations teams; engineers may do both. With DevOps, the two teams work together to optimize both the productivity of developers and the reliability of operations. They strive to communicate frequently, increase efficiencies, and improve the quality of services they provide to customers. They take full ownership for their services, often beyond where their stated roles or titles have traditionally been scoped by thinking about the end customer's needs and how they can contribute to solving those needs. Quality assurance and security teams may also become tightly integrated with these teams. Organizations using a DevOps model, regardless of their organizational structure, have teams that view the entire development and infrastructure lifecycle as part of their responsibilities.

AWS DevOps promotes an Infrastructure as code framework. Infrastructure as code is a practice in which infrastructure is provisioned and managed using code and software development techniques, such as version control and continuous integration. The cloud's API-driven model enables developers and system administrators to interact with infrastructure programmatically, and at scale, instead of needing to manually set up and configure resources. Thus, engineers can interface with infrastructure using code-based tools and treat infrastructure in a manner similar to how they treat application code. Because they are defined by code, infrastructure and servers can quickly be deployed using standardized patterns, updated with the latest patches and versions, or duplicated in repeatable ways.

II. Task Analysis

Central Objective:

Following instruction, students will be able to create a development environment of Eagle Inc's IBM Maximo installation on an AWS EC2 Instance as measured by rubric to a proficient or better performance level.

Key Enabling Objectives:

1. Learners will apply IBM and AWS Best practices concerning installation and configuration.
2. Learners will utilize AWS S3 storage for file transfers and downloads.

Foundations of AWS EC2 Instances for *IBM Maximo

Objective 1.0 Explain the Five Stages for launching an EC2 Instance and the components of each..

1.0.1 AWS EC2 Launch Instance Stages for IBM Maximo
- 1.0.1.1 Choose AMI
- 1.0.1.2 Choose Instance Type
- 1.0.1.3 Configure Instance
- 1.0.1.4 Add Storage
- 1.0.1.5 Configure Security Group

Objective 2.0 Review basic installation and configuration steps for IBM Maximo

2.0.1 IBM Maximo Pre-Installation Tasks
- 2.0.1.1 Creating a Test Copy of your Maximo Database
- 2.0.1.2 Administrative User Permissions
- 2.0.1.3 Understanding System Requirements

2.0.2 Establishing Supported Middleware
- 2.0.2.1 Unzipping Installation packages into a single directory
- 2.0.2.2 Installing IBM Websphere
- 2.0.2.3 Preparing IBM Websphere

2.0.3 Migrating Maximo Database
- 2.0.3.1 Using an EC2 Instance for a Database Server
- 2.0.3.2 Using AWS RDS (hosted cloud database)

2.0.4 Running IBM Maximo Installation Program
- 2.0.4.1 IBM Tivoli's process automation suite package group
- 2.0.4.2 Maximo Asset Management version 7.6.1 configuration program
- 2.0.4.3 Apply application server configuration settings

Choose AMI

Objective 1.0.1.1 Choose an AMI template that contains the software configuration required to launch your instance.

1.0.1.1.1 Choose the Operating System
- 1.0.1.1.1.1 Microsoft Windows
- 1.0.1.1.1.2 Amazon Linux
- 1.0.1.1.1.3 Other Linux (Red Hat, Ubuntu, SUSU Enterprise, Debian)

1.0.1.1.2 Consider Application Server (Features that come with Operating System (standard, enterprise, datacenter)
- 1.0.1.1.2.1 Enterprise Edition
- 1.0.1.1.2.2 Standard Edition

1.0.1.1.3 Bundle with Applications
- 1.0.1.1.2.1 Database Server (SQL Server)
- 1.0.1.1.2.2 Deep Learning

Objective 1.0.1.2 Understanding Free Tier Eligible.

1.0.1.2.1 Micro-instances
- 1.0.2.1.1.1 Minimum resources.

Choose Instance Type

Objective 1.0.1.2 Match varying combinations of CPU, memory, storage, and networking capacity that can meet your computing needs.

1.0.1.2.1 CPU
- 1.0.1.2.1.1 Optimize for processing

1.0.1.2.2 Memory
- 1.0.1.2.2.1 GiB

1.0.1.2.3 Storage
- 1.0.1.2.3.1 EBS Only

1.0.1.2.4 Network performance
- 1.0.1.2.4.1 Low-to-25Gbit

Objective 1.0.2.2 Understanding Optimization use cases.

1.0.2.2.1 Type Families
- 1.0.2.2.1.1 General Purpose
- 1.0.2.2.1.2 Compute Optimized
- 1.0.2.2.1.3 Memory Optimized
- 1.0.2.2.1.4 Accelerated Computing
- 1.0.2.2.1.5 Storage Optimized

Configure Instance

Objective 1.0.3 Given financial constraints, evaluate if your use case will accommodate Request Spot Instances over On-Demand instances.

1.0.3.1 Purchase Options
- 1.0.3.1.1 Request Spot Instances
- 1.0.3.1.2 On-Demand Instances

1.0.3.2 Network
- 1.0.3.2.1 Subnets
- 1.0.3.2.2 Elastic IP Addresses

Objective 1.0.3.3 Evaluate resources and dependencies of shutdown behavior, monitoring, and tenancy.

1.0.3.3 Shutdown behavior
- 1.0.3.3.1 Hibernation behavior
- 1.0.3.3.2 Cloudwatch for detailed monitoring
- 1.0.3.3.3 Shared vs dedicated tenancy

Add Storage

Objective 1.0.4 Given scenario-based use case, determine if default values for storage are sufficient.

1.0.4.1 Size (GiB)
- 1.0.4.1.1 Volume Type (default SSD)
- 1.0.4.1.2 IOPS (100/3000)

1.0.4.2 Encryption

Objective 1.0.4.1 Given an IBM Maximo enterprise application server, determine minimum system requirements.

1.0.4.1 IBM Maximo Minimum System Requirements
- 1.0.4.1.1 Minimum storage
- 1.0.4.1.2 Recommendations for IBM Maximo.

Configure Security Group

Objective 1.0.5 Configure firewall rules that control traffic inbound and outbound for IBM Maximo.

1.0.5.1 RDP for Windows Servers
- 1.0.5.1.1 HTTP/HTTPS for inbound traffic.
- 1.0.5.1.2 Database connectivity
- 1.0.5.1.3 IBM Maximo default ports

Objective 1.0.5 Configure firewall access for a specific IP address.

1.0.5.2 Type (All access?)
- 1.0.5.2.1 Protocol and Port
- 1.0.5.2.2 Source

1.0.5.3 Review and Launch
- 1.0.5.3.1 Final edit before launch
- 1.0.5.3.2 Assign key pair

Installation and Configuration of IBM Maximo

Objective 2.0.1 Review basic installation and configuration steps for IBM Maximo

2.0.1 IBM Maximo Pre-Installation Tasks
- 2.0.1.1 Creating a Test Copy of your Maximo Database
  - 2.0.1.1.1 Create a Backup for your Maximo database.
  - 2.0.1.1.1 Restore Maximo database to AWS
- 2.0.1.2 Administrative User Permissions
  - 2.0.1.2.1 The user installing IBM Maximo must have Administrative Permissions.
- 2.0.1.3 Understanding System Requirements
  - 2.0.1.3.1 Supported Server Operating Systems.
  - 2.0.1.3.2 Minimum hardware requirements
  - 2.0.1.3.3 Supported Application Server(s)
  - 2.0.1.3.4 Supported Database versions.

Objective 2.0.2 Install and Configure IBM Websphere

2.0.2 Establishing Supported Middleware
- 2.0.2.1 Unzipping Installation packages into a single directory
- 2.0.2.2 Installing IBM Websphere
- 2.0.2.3 Preparing IBM Websphere

Objective 2.0.3 Migrate IBM Maximo database to AWS

2.0.3 Migrating Maximo Database
- 2.0.3.1 Using an EC2 Instance for a Database Server
  - 2.0.3.1.1 Gather JDBC connection string information
  - 2.0.3.1.2 Using EIP address vs DNS hostname.
- 2.0.3.2 Using AWS RDS (hosted cloud database)
  - 2.0.3.2.1 Database Admin permissions.

Objective 2.0.4 Install and configure IBM Maximo

2.0.4 Running IBM Maximo Installation Program
- 2.0.4.1 IBM Tivoli's process automation suite package group
- 2.0.4.2 Maximo Asset Management version 7.6.1 configuration program
- 2.0.4.3 Apply application server configuration settings

III. Learning Experiences and/or Instruction

III-A. Learning Objectives

Learning objectives for Eagle Inc. learners that are consistent with the broadgoals, learner analysis, and task analysis.

KNOWLEDGE-BASED OBJECTIVES

By the end of this instructional session, learners will be able to:

• Explain the Five States for launching an AWS EC2 Instance and the five components of each:

1. Choose AMI
2. Choose Instance Type
3. Configure Instance
4. Add Storage
5. Configure Security Group

- Review basic installation and configuration steps:

1. IBM Maximo Pre-Installation Tasks
2. Establishing Supported Middleware
3. Migrating Maximo Database
4. Running IBM Maximo Installation Program

• Distinguish the best fit Instance Type for an IBM Maximo instance on AWS EC2.

• Devise the proper combination of AMI, RAM, CPU, Storage, and network performance for an IBM Maximo instance.

• Develop Firewall settings when configuring security groups for an AWS instance of IBM Maximo.

PERFORMANCE-BASED OBJECTIVES

• Demonstrate launching an AWS Instance configured for IBM Maximo.

• Execute the Installation procedure for IBM Maximo on an AWS EC2 Instance.

• Complete Configuration for the IBM Maximo installation on AWS.

III-B. Types of Learning Experiences and/or Instruction

The instruction is intended as a self-paced, on-demand, asynchronous training. The instruction will be prerecorded and posted on Coursera accessible for enrollment through links on the Coursera.org. Learners who have no experience with Amazon Web Services are encouraged to enroll in a 1-hour free Coursera course titled: Coursera.org offers a free 1-hour course titled "Create AWS EC2 Virtual Machine Using AWS Console."

The instruction is divided into four modules which match the learning objectives:

Module 1: Video lecture of AWS EC2 Instance Types and recommendations.
Module 2: Video lecture overview covering migration of IBM Maximo to AWS EC2.
Module 3: Video demonstration executing the steps of:

(A) Planning an EC2 Instance dedicated to IBM Maximo.
(B) Launching an EC2 Instance designed for IBM Maximo.
(C) Installing and configuring IBM Maximo for your launched EC2 Instance.

Module 4: Video lecture on ongoing support of IBM Maximo in an AWS EC2 environment, including documentation.

COURSE LAB: See Appendix A3. This is not a requirement, but highly recommended for those participating in the Confirmative Evaluation.

Each module is less than 120 minutes long except for Module 3 which is about 3 hours. At the end of each module, learners can type or record a video of questions they have relating to the training. Materials necessary for instruction include personal or workplace computers, Internet access, and a Coursera account setup by Eagle Inc. Eagle Inc. must setup user accounts on Amazon Web Services for learners to replicate the training steps in the modules.

III-C. Assessment Plan

At the beginning of module 1, learners will undergo a formative knowledge assessment for a minimum technical understanding in these areas: Amazon Web Services, Enterprise Application Architecture, Databases, and Networking. It's mostly to make sure they have an entry-level understanding of each domain. If they don't, they are recommended, not required, to watch an introduction to IBM Maximo course posted on Coursera.org before beginning this course.

Once they begin this course, there is an interactive summative assessment at the end of each module. Although this is a prerecorded training video, it has been recorded using ActivePresenter software which allows for programmed interactions such as multiple choice, true/false, fill in the blank, matching, and sequencing questions. The assessment results are made available to the client's sponsors.

III-D. Materials for Training Program or Learning System

The training course is posted on Coursera.org for high availability and convenience. It offers downloadable PDFs that summarize module lectures related to IBM Maximo system requirements, AWS instance types, and best practices for both. The video lectures are recorded using ActivePresenter which includes a slide presentation and assessments. These media decisions were chosen to minimize costs and nonelectronic documentation.

A sample of the IBM Maximo Best Practices Table of Contents is included in Appendix A.

III-E. Implementation Plan, including Schedule

This training is conducted 100% asynchronously online at Coursera.org. Built into Coursera's training environment is a fully functional Learning Management System comparable to Moodle, Canvas, or Blackboard. Eagle Inc. will register learners at Coursera.org for a special group pricing package.

After Eagle Inc. registers learners for this course, the learners will be emailed login information and a hyperlink bringing them directly to the course's Introduction landing page. Learners will see a beginning page similar to the example below:

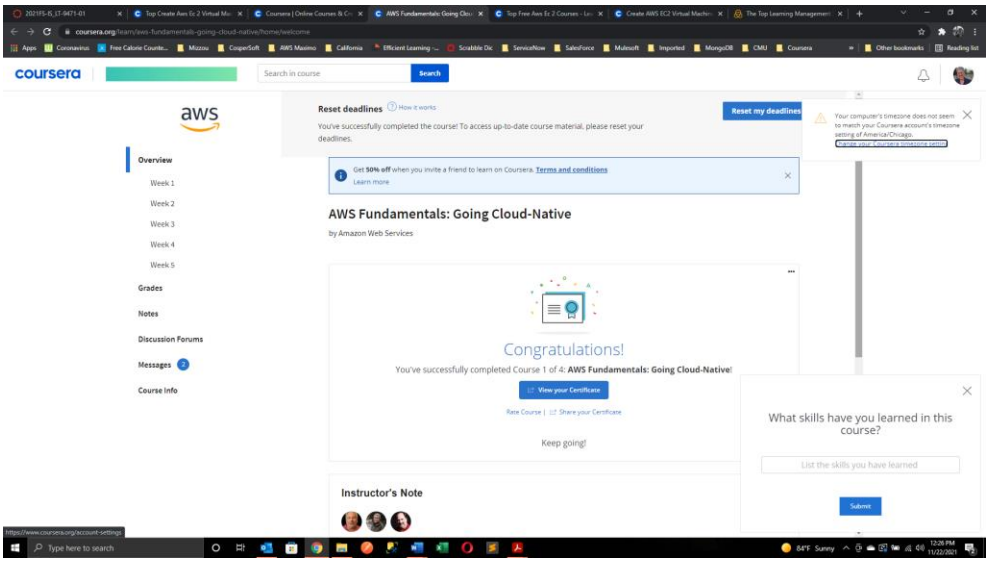

Figure 1: Standard Coursera course homepage.

The course homepage begins with an overview of the course. On the left panel learners will find the courses broken down into modules. Below that will be links to grades, notes, discussions, messages, and course info.

When learners click on module 1, they will first be introduced to a formative evaluation (see more below). At the end of each module is an assessment testing them on key learning objectives. The results of module assessments are displayed after each assessment is completed and may be reviewed and retaken by clicking on the Grades link.

See Implementation Schedule in Appendix A.

IV. Evidence of Acceptable Results

IV-A. Formative Evaluation

Formative evaluations conducted before the IBM Maximo to AWS Instance migration training will be done using the Coursera Learning Management System.

The two biggest concerns for the chosen formative evaluations are concerning the learning platform, Coursera, and the cloud provider, AWS.

The questions below gather data on the Kirkpatrick's level 1: Learner Reaction of Coursera and the AWS platform. Do the learners prefer another corporate training platform? Also, how do they feel about the AWS console? Although the training is to migrate IBM Maximo to an AWS Instance there are other options, most notably IBM and Google Cloud. This formative evaluation seeks to find the learner's attitude towards the environments that may be new to them.

See Evaluations in Appendix A.

IV-B. Summative Evaluation

The summative evaluations are done at the end of each module using the Kirkpatrick Four-Level Model. The actual evaluation is on Google Forms. The learners must demonstrate four types of knowledge relating to their training of AWS Instances and the configuration of IBM Maximo: Factual, Conceptual, Procedural, and Metacognitive knowledge.

While all the students in this course participate in learning about AWS and migrating IBM Maximo to it, only a few will actually perform the duties for their jobs in a production environment for Eagle Inc. It isn't a requirement to be proficient but rather, grasp the basic concepts. Everyone who takes the training will be evaluated for basic concepts.

See Evaluations in Appendix A.

IV-C. Confirmative Evaluation

System Administrators will perform the migration duties at Eagle Inc. Those who do will participate in the confirmation evaluation. They will create a Development environment on an EC2 Instance, then install and configure IBM Maximo. This includes migrating a copy of their production database. A CosperSoft LLC Training Professional will confirm the Development environment meets system requirements for an IBM Maximo installation based on the documentation provided during the training.

System Administrators are highly recommended to take the COURSE LAB which walks through all the steps in this course.

IV. References

"What Is Cloud Computing." *Amazon Web Services, Inc.*, Amazon Web Services, aws.amazon.com/what-is-cloud-computing/?nc1=f_cc. Accessed 17 Oct. 2021.

"AWS Learning Needs Analysis (LNA)." *NetCom Learning*, www.netcomlearning.com/lp/aws-learning-needs-analysis.phtml. Accessed 25 Oct. 2021.

"What Is DevOps? - Amazon Web Services (AWS)." *Amazon Web Services, Inc.*, aws.amazon.com/devops/what-is-devops. Accessed 27 Oct. 2021.

V. Appendices. Evaluation Materials, Implementation Plan, Training Materials, Task Analysis

Appendix A1: Evaluation Materials:

Formative Evaluation of Coursera Learning Environment:

1. Have you used Coursera for learning before?
2. Do you like the Coursera learning environment?
3. Are you able to navigate through the Coursera Learning website comfortably?
4. Do you have any negative opinions related to learning on the Coursera Learning website?
5. Do you prefer another Corporate Training provider? (Udemy, LinkedIn Learning, Other)?

Formative Evaluation of Amazon Web Services Cloud Platform:

1. A prerequisite for beginning this training is to already have an Amazon account created on https://aws.amazon.com/. Have you had any issues or concerns creating your account with AWS?
2. Is the AWS Console comfortable to navigate?

3. Have you had any troubles finding the information you're looking for utilizing the search or help?
4. Do you have any reservations about using the AWS Cloud platform?
5. Do you need more information about AWS billing before moving forward with this training?

Summative Evaluation of Amazon Web Services:

1. What kind of AWS Type are you likely to choose for an IBM Maximo installation?
2. What mix of CPUs and RAM do you plan to launch for your IBM Maximo environment?
3. How much storage do you need? Remember, the more resources you use the more you pay, so choosing too much is a waste of money.
4. What Operating System is best for Eagle Inc's migrated IBM Maximo system?
5. What ports must you open through the firewall to connect using RDP?
6. What ports should be open to view the IBM Maximo or Websphere Console pages?

Summative Evaluation of IBM Maximo Installation and Configuration:

Below is the interactive Summative Evaluation I created on Google Forms. The learners are emailed a hyperlink to this Google Forms assessment and it is interactive in that their results are known immediately following submission.

Google Forms

Having trouble viewing or submitting this form?
FILL OUT IN GOOGLE FORMS

I've invited you to fill out a form:

IBM Maximo Assessment

Summative Assessment for IBM Maximo Migration to AWS EC2 Instance Training

Email *

1. A company is deploying Maximo and will have Integration Application Servers (JVMs).What is the function of these Application Servers (JVMs)?

- ( ) A: To process workflows.
- ( ) B: To process Cognos reports.
- ( ) C. To process inbound messages.
- ( ) D. To process Migration Manager packages.

2. A company requires that their text fields be indexed.What must the database administrator do to meet this requirement? *

- ( ) A. Install the Full-Text add-on module to Maximo.
- ( ) B. Create a separate tablespace for the text indexes.
- ( ) C. Install or enable Full-Text Search on the database.
- ( ) D. Enable text indexing on every field that they want to be indexed.

3. An administrator has a requirement to prevent hacking and denial of service attacks and has enabledthe system property mxe.sec.IPblock. An IP address will be blocked when which of the following occurs? (Choose two.) *

- [ ] A. Too many login attempts from the same address.
- [ ] B. Too many redirects occurring from the same address.
- [ ] C. Too many self-registration attempts from the same address.
- [ ] D. Too many successive keepalive packets received from the same address.

4. A company has added additional languages to Maximo and now need to install the new translatedhelp files for those languages using Tivoli's process automation suite configuration tool.How would this be accomplished? *

- ( ) A. TDToolKit
- ( ) B. Add Additional Languages
- ( ) C. Enable multi-language help
- ( ) D. Install product help information in another language

5. A company requires Maximo to own user and group creation but still authenticate against thedirectory server.Which system property can be set to achieve this functionality? *

- ( ) A. mxe.LDAPUserMgmt
- ( ) B. mxe.AllowLDAPUsers
- ( ) C. mxe.LDAPGroupMgmt
- ( ) D. mxe.useAppServerSecurity

6. A company would like to audit a field on a new custom object in Maximo. The Audit Enabled checkboxon the attribute in the Database Configuration application is read only.What first step must be performed in order to audit this attribute? *

- ( ) A. The attribute must be searchable.
- ( ) B. Auditing must be enabled on the object.
- ( ) C. The attribute must be E-Signature enabled.
- ( ) D. Auditing must be enabled in the system properties application.

7. A company has created an inactive Organization in Maximo which is scheduled for roll out in sixmonths.What must be defined to the saved Organization before it can be activated? *

- ( ) A. Item Set
- ( ) B. Currency
- ( ) C. Company Set
- ( ) D. Clearing Account

8. A company wishes to configure E-Signature within Maximo so that users must be re-authenticatedwhen they change certain fields.What must be configured for this to function? *

- ( ) A. Auditing must be enabled.
- ( ) B. LDAP authentication must be used.
- ( ) C. E-Signature must be enabled in Application Designer.
- ( ) D. E-Signature must be flagged on the Attribute in the Database Configuration application.

9. A company wants to enable application import for the Asset application.What are the steps required? (Choose two.) *

- [ ] A. Enable the JMS queues for data import and export.

- [ ] B. Enable application import and export support for the ASSET object structure.
- [ ] C. Grant application import and export on the Asset application to the security group.
- [ ] D. Add the ASSET object structure to an enterprise service and add it to an external system.
- [ ] E. Modify the application XML to include the export and import buttons on the Asset application.

10. A company has a large number of complex BIRT reports accessed by many users. An administratorwants to configure automatic cancellation of very large reports from processing once a configurablelimit has been reached.Which feature can be used to configure this? *

- ( ) A. Report User Limits
- ( ) B. Report Server Limits
- ( ) C. Report Limit Cron Task
- ( ) D. Report Schedule Limits

[Submit]

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Appendix A2. Implementation Plan.

Module	Name	Sub Module	Description	Module Duration: Min	Submodule Duration: Min	Details Duration: Min
1	AWS EC2 Instance Types and recommendations.		Introduction to AWS EC2 Instances	90		
1	EC2 Instance Types		Most common scenarios for IBM Maximo installations		30	
1		Choosing AMI	Operating System Image			10
1		Instance Types	RAM & CPU			10
1		Storage	Hard Drive Capacity			5

1		Firewalls	Security Groups			10
Module	Name	Sub Module	Description	Module Duration: Min	Submodule Duration: Min	Details Duration: Min
2	Migration Steps: IBM Maximo to AWS		Overview covering migration of IBM Maximo to AWS EC2.	115		
2	IBM Maximo Prerequisites		Prepping before IBM Maximo Installation		15	
2		Admin Permission	Installation user must be an admin.			3
2		Websphere 9	Maximo 7.6.1 runs on Websphere 9.0.0.7			2
2		Operating System	Must install on specific versions of Windows or Linux.			5
2		Database	Oracle, SQL Server, DB2			5
2	Installing IBM Maximo		IBM Maximo Installation Steps		100	
2		Running Maximo Installer	IBM Tivoli's process automation suite package group			30
2		Installing Middleware	Installing IBM Websphere and Database			30
2		Configuring IBM Maximo for WebSphere	Preparing IBM Websphere for an IBM Maximo configuration			30
2		Deploying Maximo EARS	Final Step before logging in.			10

Module	Name	Sub Module	Description	Module Duration: Min	Submodule Duration: Min	Details Duration: Min
3	Video demonstration executing Modules 1 and 2.		Streamlined videos demonstrating execution of learning objectives:	180		
3		Planning an AWS EC2 Instance dedicated to IBM Maximo.	Video demonstrating choosing the correct EC2 Instance type(s) for IBM Maximo.		30	
3			Ideal EC2 AMIs for Windows and Linux			5
3			Ideal RAM and CPU			10
3			Ideal Storage			5
3			Ideal Security Groups (Firewall)			10
3		Launching an EC2 Instance designed for IBM Maximo.	Video demonstrating the steps to launch an AWS Instance for IBM Maximo.		30	
3			Starting the EC2 Instance			5
3			Verifying Instance is online			5
3			Setting up a key pair			10
3			Using RDP for Windows			10
2		Installing and configuring IBM Maximo for your launched EC2 Instance.	Video demonstrating the steps to install, configure, and deploying IBM Maximo on an AWS Instance.	120		

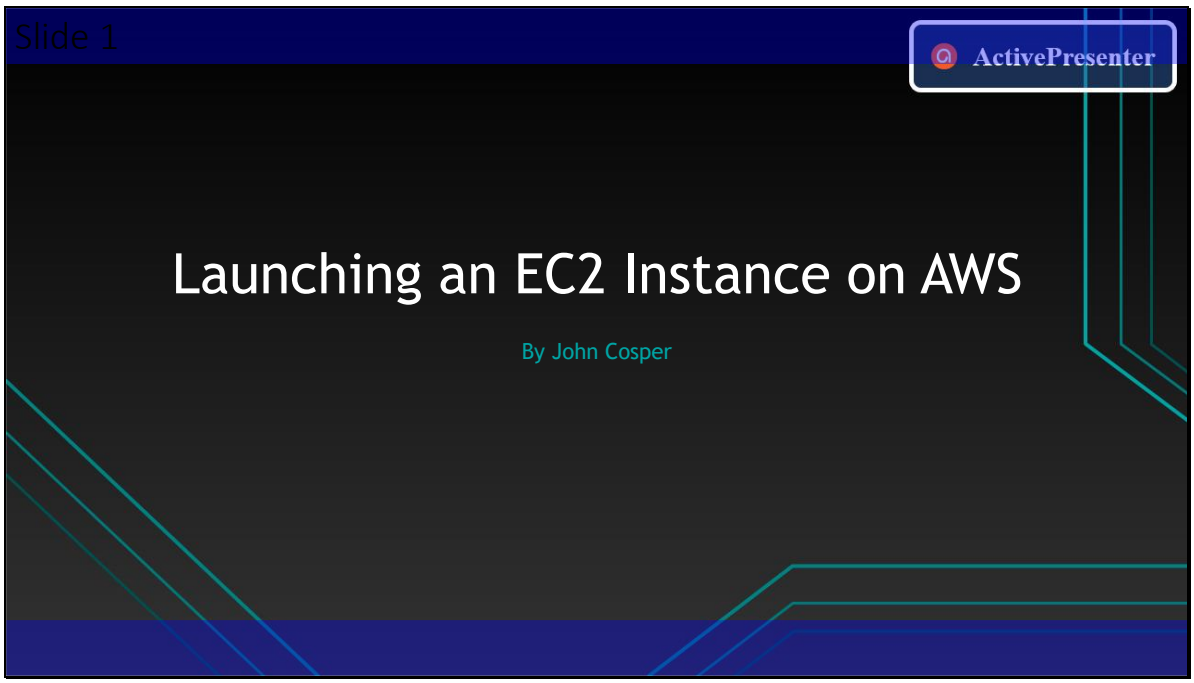
Module	Name	Sub Module	Description	Module Duration: Min	Submodule Duration: Min	Details Duration: Min
		Preparing Maximo Installation	Unzipping Installation files into directory.		10	
			Running Maximo Installer: Install Middleware (Websphere)		30	
			Install IBM Maximo		30	
			Configure Maximo		30	
3			Deploy EAR files		5	
4	Video lecture on ongoing support of IBM Maximo in an AWS EC2 environment, including documentation.		Lecture going over IBM Best Practices for IBM Maximo	60		
4		Factors for System Performance	The Maximo Infrastructure, Cron tasks, Reporting, Integrations, Networking, Load Balancing, Database tuning, SQL Tuning, and others.		10	
4		System Architecture	Scalability			5
4			Basic System Configuration			5
4		Websphere Application Tuning	JVM, HEAP, etc.		10	
4		Database Tuning & Maintenance	Indexing, Tablespaces, etc.		10	5
4			SQL tuning			5
4		IBM Maximo tuning			30	

Module	Name	Sub Module	Description	Module Duration: Min	Submodule Duration: Min	Details Duration: Min
4			Cron tasks			5
4			Escalations			5
4			MIF			10
4		Operating System	MS Windows			5
4		Mobile Applications	Maximo Anywhere			2
4			Troubleshooting & Support			3

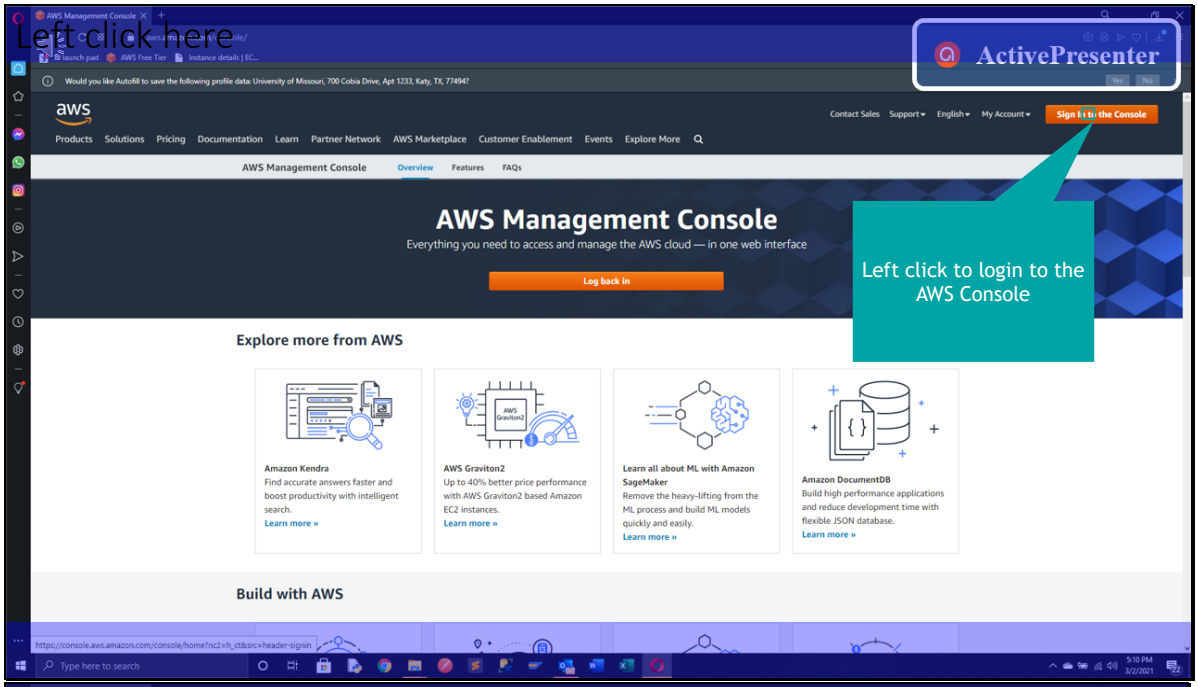
Appendix A3. Sample Training Materials

Handout for Learning Module 3 including Screenshots of video demonstration: Launching an AWS Instance:

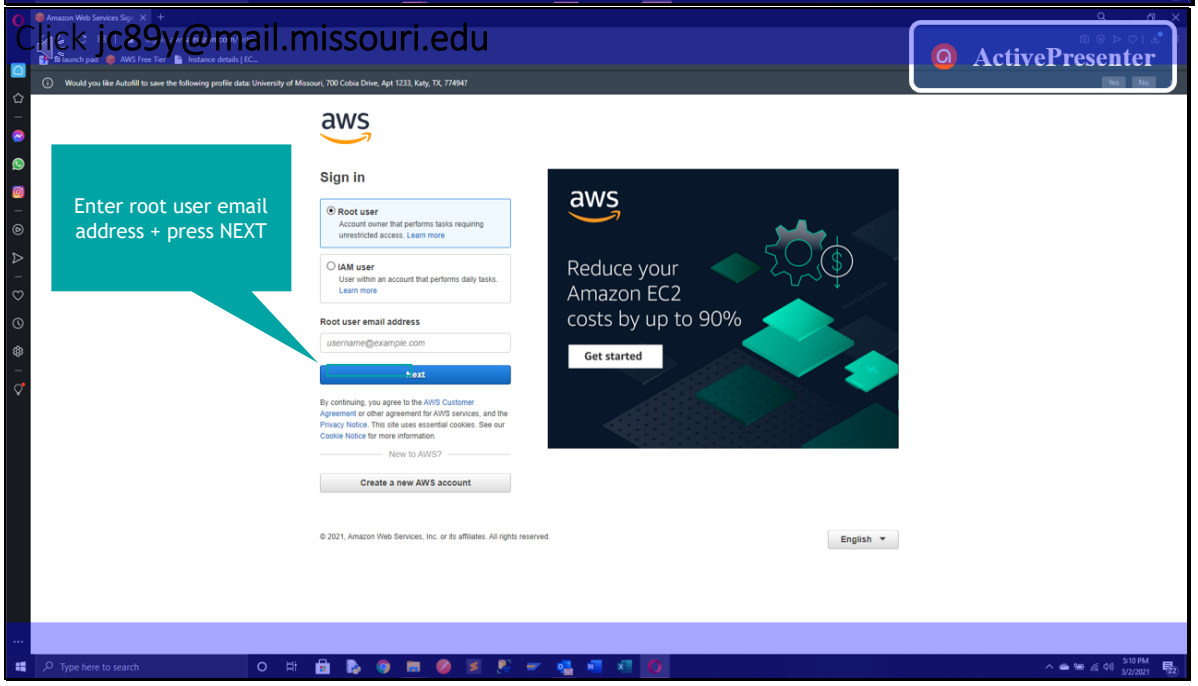
Slide 1



Slide 2



Slide 3



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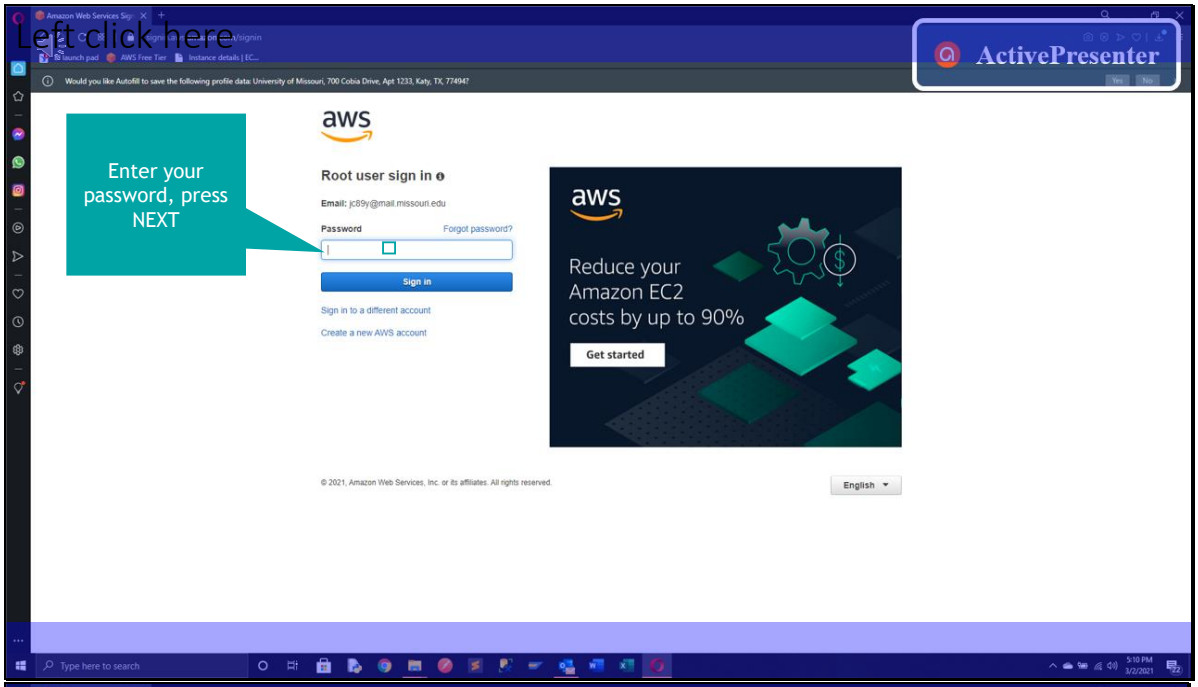

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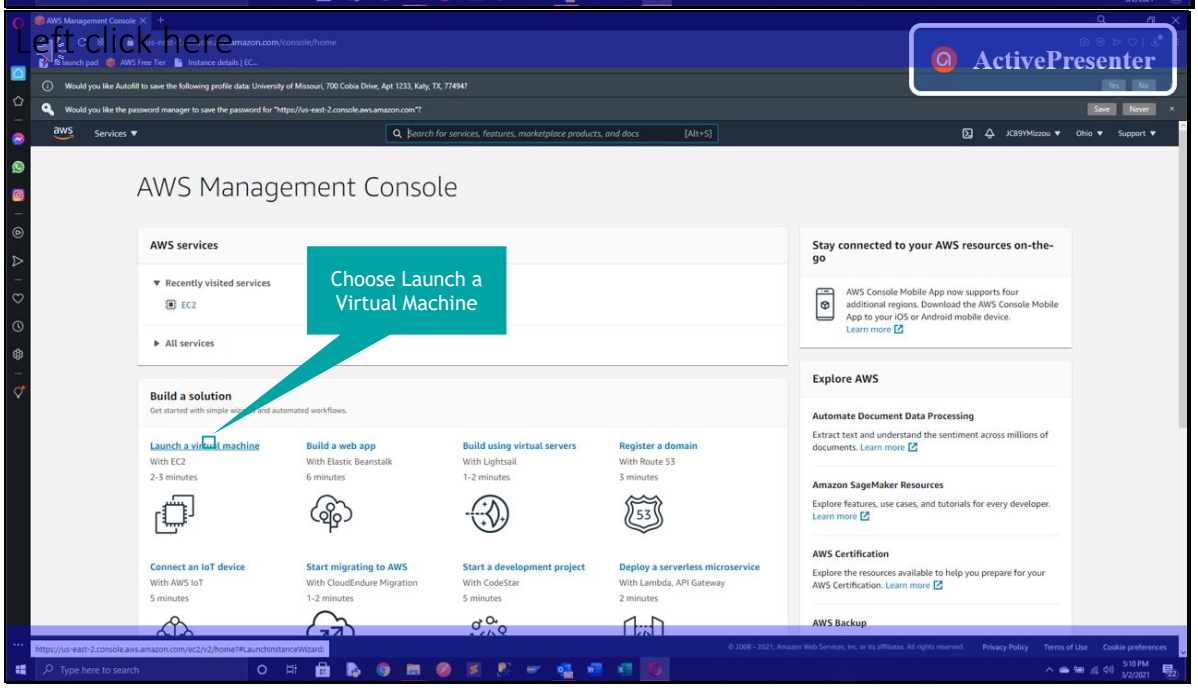

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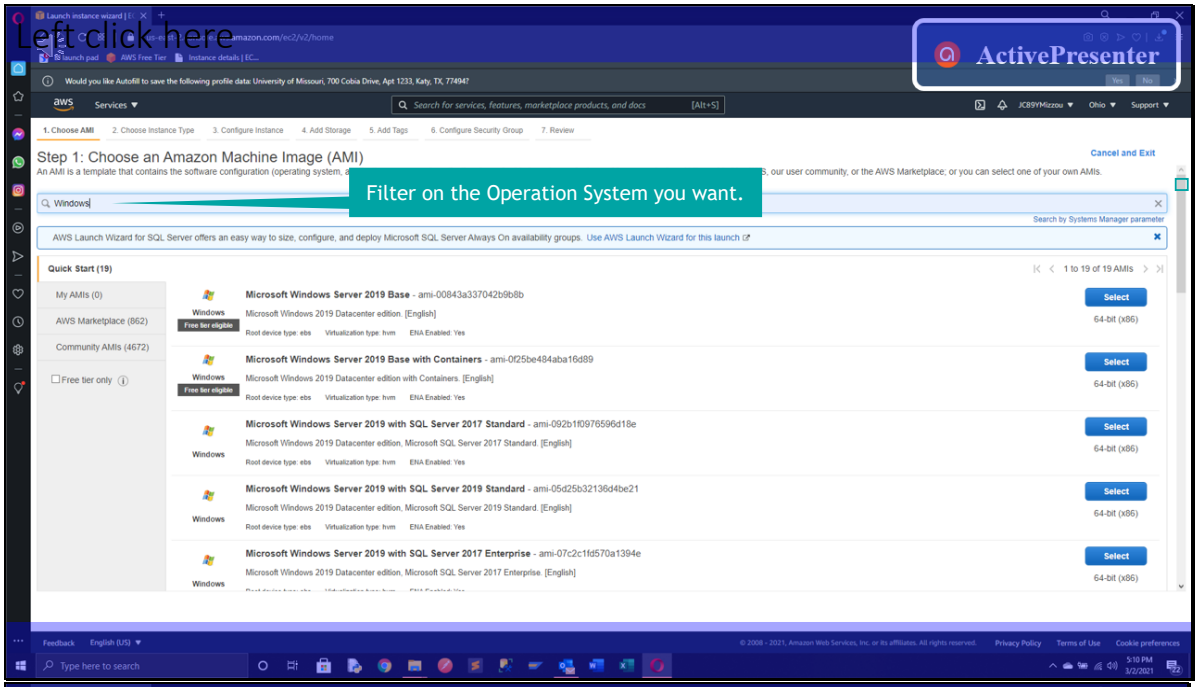

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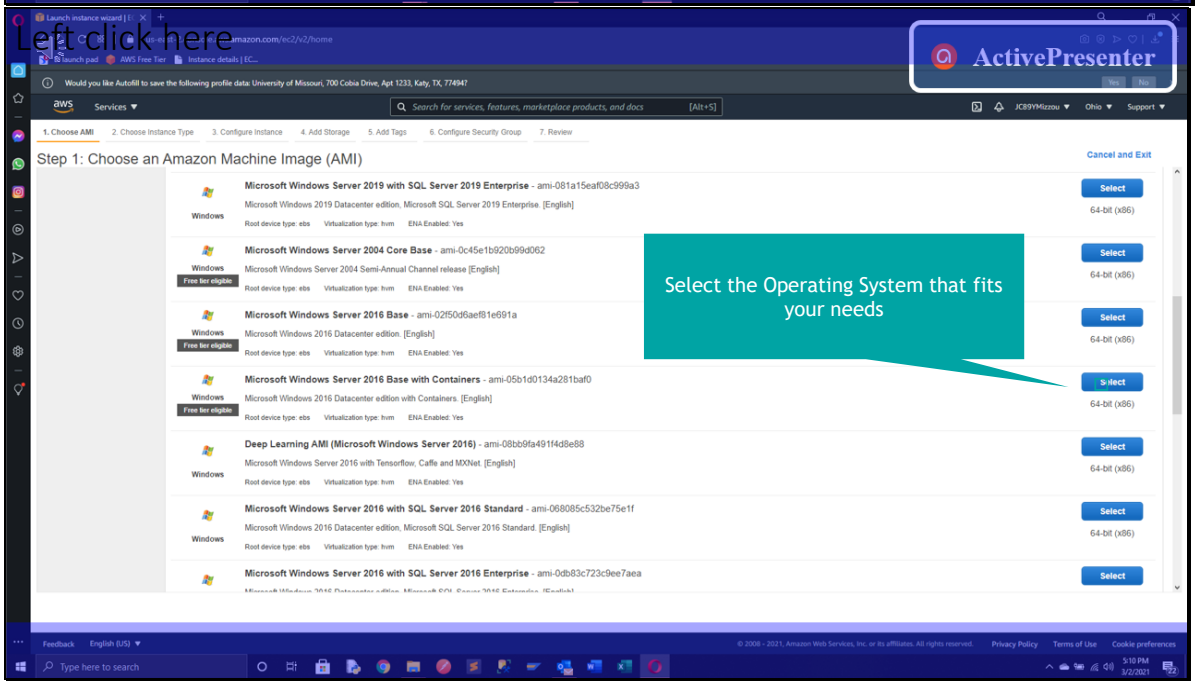

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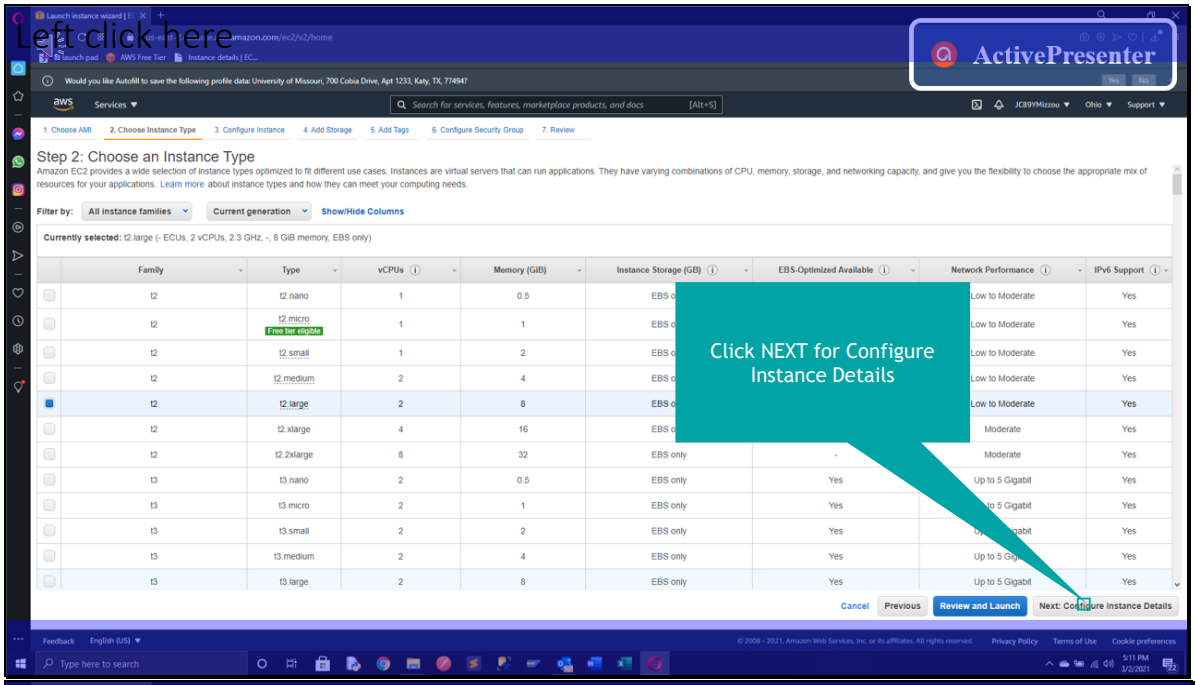

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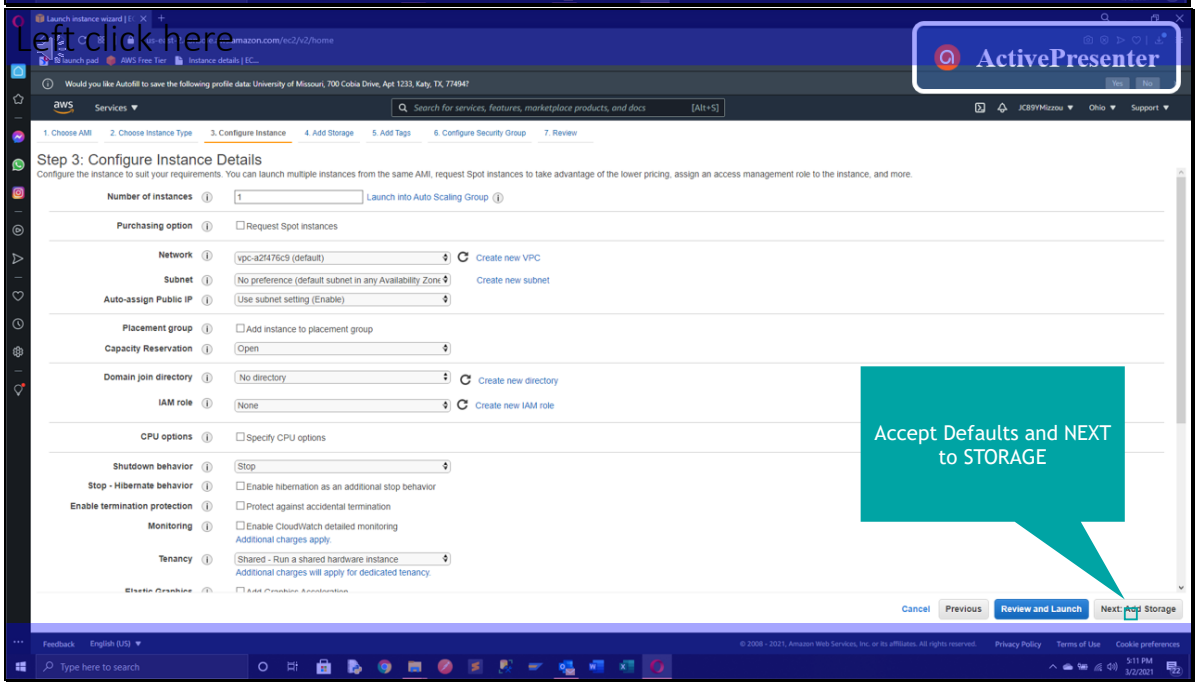

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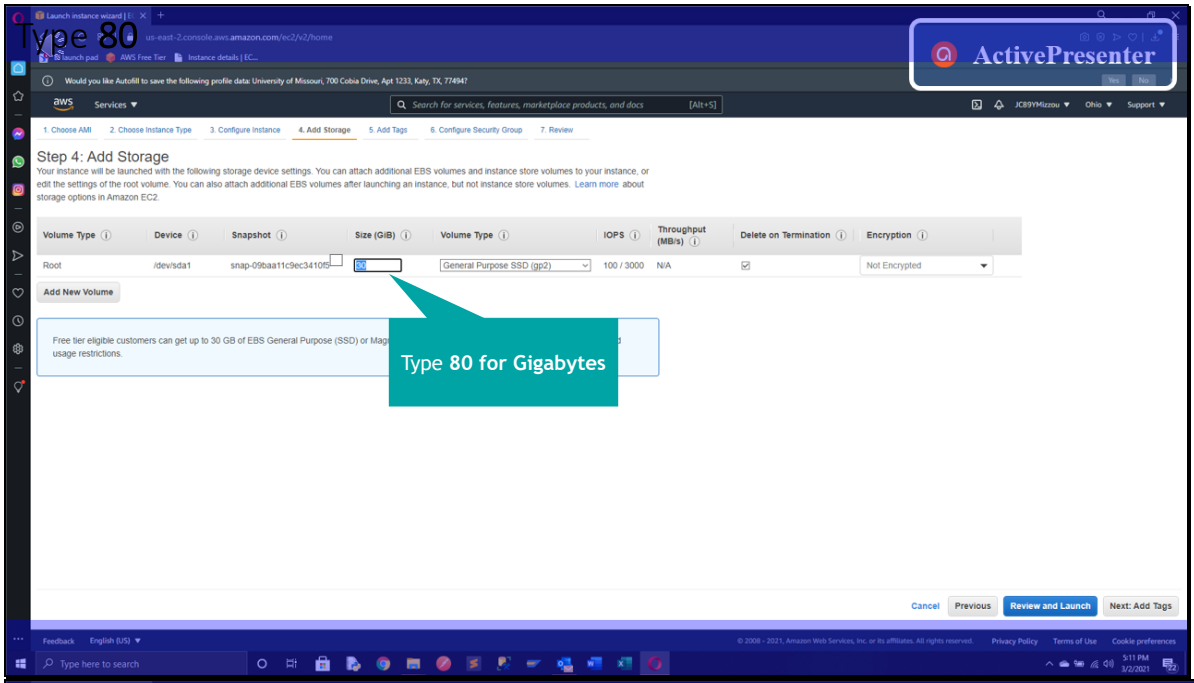

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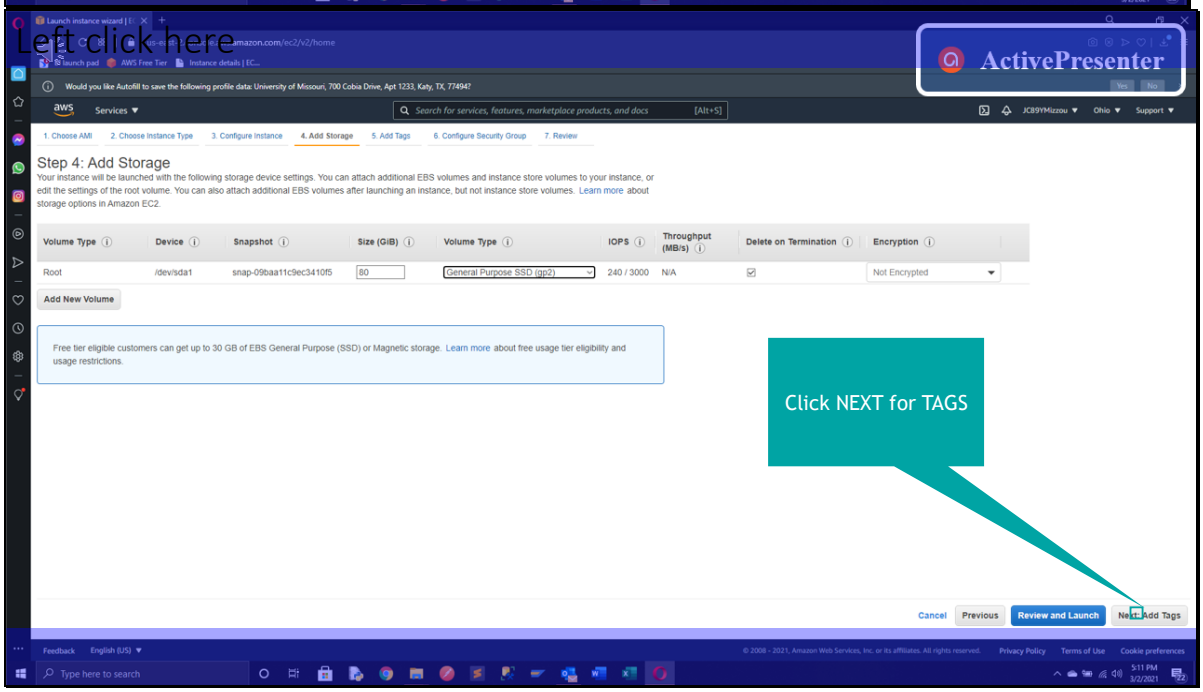

COURSE LAB

Step-by-Step Instructions: Launch AWS Instance and Installing and Configuration IBM Maximo.

1. Launch a new AWS Instance.
    a. **Microsoft Windows Server 2012 R2 with SQL Server 2016 Standard** - ami-08361fa95e0ca0a55
    b. **Type=default**
    c. **Configure Instance=defaults**
    d. **Storage=100gb**
    e. **Tags: name, maximo**
    f. **Add rule: All traffic, source=anywhere**
    g. **Use existing Key Pair or create new one.**
    h. **Launch. (takes a few minutes)**

2. Connect to AWS Instance (filter for new one if not in list).
    a. Download Remote Desktop file.
    b. Get password. You must decrypt to get password, then copy it into your RDP client.

3. Show icons on Desktop (control panel).

4. Server Manager:
    a. Add Roles and Features Wizard.
        i. Add Active Directory Domain Services
        ii. Add LDAP
        iii. Add Remote Access
            1. RAS and Routing (next… install)…. (don't restart yet).

5. After above is installed, CHANGE the SERVER Name to your liking: max76, (don't restart yet)

6. AWS control: Allocate Elastic IP address
    a. Associate EIP to running Instance.
    b. 3.133.189.59….. you may lose the Remote Desktop connection.
    c. Reconnect using a new Remote Desktop client. NOW RESTART.

   d. Note: Make sure your RDP client includes your local resources: drives (this is to copy files initially).

7. Add a new personal Admin user: Maxadmin
   a. Control Panel: User accounts.
   b. Add user, and be sure to change the type to Administrator.

8. Server Manger: click yellow sign at top to, then…
   a. Choose "Promote to domain controller.
   b. Add a new Forest: Root domain name eaglecloud.com (next)
   c. Set password, next, next, next, next, next, INSTALL
   d. Windows will automatically REBOOT.

9. When you log back in, go to CONTROL PANEL.
   a. Turn Windows FIREWALL OFF.

10. Verify you can reach your server from your laptop: Enter the EIP into any web browser. You should see the IIS page come up.

11. Create a shortcut from the source folder (where all your files are) to the desktop on your server.

12. Create a new folder on desktop called MaxInstall.

13. Copy these to server: JRE, Firefox Installer, FilezillaServer, and 'Ibm_Installation_Mgr'.

14. Install JRE.

15. Install Firefox, set it as your DEFAULT BROWSER on Server.

16. Install FileZilla. Use Default settings. Allow it to start at end of install.
   a. Add a user to the server.
   b. Share the MaxInstall folder on Server Desktop and check every box for permissions.
   c. Install client on your pc.

d. Open client and in QUICK CONNECT settings, put the EIP + Username + Password.
    i. It should connect and you should see the Shared MaxInstall Folder.

17. Using FIlezilla Client, begin dragging IBM Maximo zips:
    a. MAM_7.6.0.0_WIN64.zip
    b. Middl_Inst_WAS_855_1of3 (and other 2).

18. While that is copying, go back to RDP of Server desktop.

19. Unzip the IBM_InstallationMgr Zip into the MaxInstall folder.

20. Run As Admin, the Install file.

21. Install it into the C:\IBM folder (remove "program files" from the path).

22. Extract the MAM folder into the MaxInstall folder, but make sure the name is short: MAM76

23. Copy the Middl_Inst_WAS_855 zips over to MaxInstall (should take a couple of hours)

24. Extract the Middle_Inst_WAS zips into the same folder, then copy the contents of that INSTALL folder into the MAM INSTALL folder. You will see a DB2 package there.

25. Verify Requirements: In DOS, CD C:\Users\Administrator\Desktop\MaxInstall\MAM76\SystemRequirements
- Try running the TPAE_REQ_HECK script.

26. Go to DOS (run as admin)

27. Cd to C:\Users\Administrator\Desktop\MaxInstall\MAM76.

28. Run command: set BYPASS_PRS=True

29. Now run: launchpad64

30. Install websphere only (uncheck DB2 and Maximo)

31. Pressing NEXT, ignore error.

32. On HTTP error, change the default port on IIS from 80 to 8080. You do this by clicking on the default site BINDINGS.

33. SQL Server: Login as Administrator, Windows authentication.
    a. Create MAXADMIN login for SQL Server.
    b. Create user maximo
        i. CANNOT create database.
        ii. Installing NEW SSMS (v. 18); This worked.
    c. Create maximo database and make user maximo owner.
    d. NOTE: I found the database was only configured for Windows Authentication, so I had to change it to both and restart SQLSERVER service.

34. Install Maximo.

35. Configure product.
    a. Accept the defaults. I had it create and configure a new database.
    b. Deploying ears didn't work, so I closed the configuration tool and did it manually.

33. Deploying ears manually didn't perfectly work, but I'm moving forward with patching Maximo to 7.6.0.9 which will do a redeploy during it's process.

34. After updating Maximo with the latest patch, run "Update Database and Build and Deploy App ear files" from Tivoli's Process Automation Suite Config.

Clean-up:

1. Tighten Security: Create Security RULES in AWS for all the ports listed in WebSphere under the MXSERVER ports.