FIRST hubIT
Holding your future

iOT Practitioner

(40h / 5 Days)

Description:

IoT Practitioner Training Course, is specially designed to acquire the skills and knowledge to confidently deploy and manage IoT devices using AWS IoT services as well as handling the vast amounts of data generated by IoT devices, securely transfer it into the AWS cloud, and use AWS cloud services for storage, processing, and analysis. Whether you're new to IoT or seeking to deepen your expertise, this course will provide hands-on experience in managing the entire IoT lifecycle.

y the end of the training, you will be able to create powerful IoT applications that leverage the full potential of AWS cloud technologies, ensuring seamless integration and enhanced functionality. You'll learn how to implement robust security measures to protect both devices and data, safeguarding your IoT infrastructure. Additionally, you will be able to drive innovation in your organisation by applying IoT solutions that improve

operations and enable the development of new products or services. This course will empower you to transform your IoT ideas into
reality.

Target Audience:

The target audience for the IoT Practitioners Training Program on AWS includes:

1. **IoT Developers and Engineers**: Professionals who are involved in the design, development, and implementation of IoT solutions.
2. **Systems Integrators**: Technical experts who integrate IoT devices and systems with various cloud services and IT infrastructure.
3. **IT Professionals**: Individuals working in IT roles who wish to expand their skills into the IoT space, including network engineers, systems administrators, and cloud architects.
4. **Product Managers and Project Leads**: Managers overseeing IoT or technology projects who need to understand IoT capabilities and integration with cloud services to manage projects effectively.
5. **Data Scientists and Analysts**: Professionals who leverage data collected from IoT devices for analytics, prediction, and decision-making purposes.
6. **Technology Entrepreneurs**: Innovators and startup leaders focusing on building IoT-enabled products or services.

Training Expected Outcomes:

Upon completing this training program, participants will be able to:

1. **Deploy IoT Devices**: Confidently set up and manage IoT devices using AWS IoT services.
2. **Handle IoT Data**: Effectively manage data flow from IoT devices into AWS cloud services for storage and analysis.
3. **Ensure IoT Security**: Implement robust security measures to protect IoT devices and the data they generate.
4. **Create IoT Applications**: Build complete IoT applications that leverage cloud capabilities for enhanced functionality.
5. **Drive IoT Innovation**: Innovate within their organisations by applying IoT solutions to improve operations and develop new products or services.

Training Strategy

1. **Structured Learning**: The program is organised into 10 comprehensive modules, each focusing on different aspects of IoT technology and its applications.
2. **Theoretical Lessons**: These lessons provide essential background on IoT technologies, applications, and AWS IoT services.
3. **Hands-On Labs**: Practical labs using AWS IoT services are integrated into each module, giving participants direct experience in setting up, configuring, and managing IoT devices and data.
4. **Assessments**: Each module concludes with a quiz or a practical project to assess participants' understanding and skills.
5. **Real-World Case Studies**: Case studies illustrate the practical application of IoT technologies in various industries, providing insights into real-world challenges and solutions.

Training Program

iOT Practitioner	
Training Objectives: • Understand IoT Concepts and Architecture: • Master Cloud IoT Services: • Develop IoT Solutions: • Implement IoT Security • Manage and Scale IoT Deployments	
Time	***Modules***

4 Hours
1.5h
 	
2.5h
	Module 1: Introduction to IoT and AWS IoT.
	
	Objective: Understand the basic concepts and components of IoT systems and familiarise with AWS IoT Core and other AWS IoT services.
	
	• IoT Concepts and Applications
	  ◦ Overview of IoT, key components, and how IoT systems work.
	  ◦ Real-world applications across different industries.
	• AWS IoT Overview
	  ◦ Introduction to AWS IoT services and their roles in IoT projects.
	
	Lab: Setting up AWS IoT Core and registering your first device.
	
	Assessment: Quiz on IoT fundamentals and AWS IoT architecture.

4 Hours
 	
2h
 	
2h
	Module 2: IoT Device Management.
	
	Objective: Learn effective strategies for managing large fleets of IoT devices using AWS IoT Device Management.
	
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	- Managing IoT Devices
	  - Strategies for managing large numbers of IoT devices, including registration, monitoring, and maintenance.
	- Using AWS IoT Device Management
	
	  - Practical use of AWS IoT Device Management to manage device fleets.
	
	Lab: Creating and managing a fleet of devices using AWS IoT Device Management.
	
	Assessment: Practical exercises on device management.

4 Hours	Module 3: IoT Communications and Protocols.
2h	**Objective**: Master the use of key IoT communication protocols such as MQTT, HTTP, and WebSockets, and implement secure communication strategies using AWS IoT.

2h	• Communication Protocols
	  ◦ Detailed look at MQTT, HTTP, WebSockets, and other protocols used in IoT.
	• Implementing Secure Communications
	  ◦ Best practices for securing communications between IoT devices and the cloud.
	Lab: Setting up secure device communications using AWS IoT Core.

4 Hours
 	
2h
 	
2h
	Module 4: Data Handling and Processing in IoT.
	
	Objective: Develop skills to collect, process, and route IoT data effectively using AWS IoT Analytics and other data processing tools.
	
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	- Data Collection and Processing
	  - Techniques for data collection, processing, and routing IoT data.
	- Using AWS IoT Analytics
	  - Hands-on with AWS IoT Analytics to process and analyze IoT data.
	
	Lab: Building data processing pipelines with AWS IoT Analytics.
	
	Assessment: Develop and evaluate a data processing pipeline.

4 Hours	Module 5: IoT and Machine Learning.
2h	**Objective**: Integrate machine learning into IoT applications using AWS services like Amazon SageMaker to enhance IoT data analysis and decision-making.

2h	• Integrating IoT with Machine Learning
	  ◦ Using machine learning to add intelligence to IoT devices and applications.
	• Using AWS SageMaker with IoT
	  ◦ Implementing machine learning models in SageMaker and integrating them with IoT data streams.
	Lab: Deploying a machine learning model on IoT data using SageMaker.
	Assessment: Machine learning model deployment and integration test.

4 Hours	Module 6: IoT Security.
2h	**Objective**: Implement security best practices for IoT systems, focusing on securing IoT devices and communications using AWS IoT security tools.

2h	• Security Best Practices
	  ◦ Overview of IoT security challenges and best practices for securing IoT devices and data.
	• Implementing IoT Security with AWS
	  ◦ Using AWS IoT security features such as authentication, authorization, and encryption.
	Lab: Configuring security policies and testing security measures for an IoT deployment.
	Assessment: Security setup review and vulnerability assessment.

4 Hours
 	
2h
 	
2h
	## Module 7: Real-Time Data Streaming and Analysis.
	
	Objective: Utilise AWS Kinesis for real-time data streaming and analysis, enabling immediate data processing and insights from IoT devices.
	
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	- Real-Time IoT Data Handling
	  - Managing real-time data streams from IoT devices.
	- Using AWS Kinesis for IoT
	  - Setting up and configuring AWS Kinesis for real-time data streaming and analysis.
	
	Lab: Implementing a real-time data streaming solution with AWS Kinesis.
	
	Assessment: Real-time data streaming setup and analysis.

4 Hours	Module 8: IoT Edge Computing with AWS Greengrass
1.5h	**Objective**: Equip participants with the skills to implement and manage edge computing solutions using AWS Greengrass, enabling them to process and analyse data locally on IoT devices, which reduces latency, conserves bandwidth, and enhances operational efficiency in IoT deployments.

2.5h	• Edge Computing Concepts
	  ◦ Understanding the importance of edge computing in IoT for local data processing and decision making.
	• Implementing AWS Greengrass
	  ◦ Detailed instruction on setting up and using AWS Greengrass for edge computing.
	
	Lab: Deploying AWS Greengrass on IoT devices and configuring local data processing.
	
	Assessment: Implement and evaluate an edge computing scenario using AWS Greengrass.

4 Hours

Module 9: IoT Integration with Other AWS Services.

1h

Objective: Enhance IoT solutions by integrating with a range of AWS services such as AWS Lambda, Amazon S3, and Amazon DynamoDB for additional functionalities.

- Advanced Integrations of Cloud Services
  - AWS Lambda:
    - trigger Lambda functions in response to IoT events,
    - enabling serverless computing that reacts to data and events from IoT devices.

1h

  - Amazon S3:
    - Discuss how to store IoT data effectively in S3, utilising it for durable, scalable, and secure bulk storage.

1h

  - Amazon DynamoDB:
    - Explore using DynamoDB to store and retrieve IoT data quickly and efficiently, ideal for applications that require real-time data retrieval.

1h

  - Amazon API Gateway:
    - Understand how to use API Gateway to create robust, secure, and scalable APIs for IoT devices, facilitating communication between devices and back-end services.

Lab: Creating a comprehensive IoT application that integrates multiple AWS services.

Assessment: Integration effectiveness and performance evaluation.

4 Hours	Module 10:Capstone Project and IoT Solution Deployment
	
	Objective: Demonstrate comprehensive knowledge and skills acquired throughout the course by designing, implementing, and presenting a complete IoT solution that addresses a real-world problem.
	
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	- Capstone Project
	  - Participants undertake a comprehensive IoT project that involves designing, implementing, and deploying a complete IoT solution using AWS.
	- Review and Feedback
	  - Detailed feedback on the capstone project from instructors and peers.
	
	Assessment: Final presentation of the capstone project, demonstrating the application of all skills acquired throughout the training.