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Chapter 8 Review Questions

1. What is the difference between a Xively data stream and a channel?

Xively is a commercial Platform-as-a-Service that can be used for creating solutions for IoT. Xively platform comprises of a message bus for real-time message management and routing, data services for time series archiving, directory services that provides a search-able directory of objects and business services for device provisioning and management. A Xively devices have one or more channels and each channel enables bi-directional communication between the IoT devices and the Xively cloud. Using the Xively APIs, IoT devices can send data to a channel. For each channel, one or more triggers can be created. A trigger specification includes a channel to which the trigger corresponds, trigger condition and an HTTP POST URL to which the request is sent when the trigger fires. Triggers are used for integration with third-party applications.

1. Describe the architecture of a Django application.

Django is a Model-Template-View framework wherein the roles of model, template and view are:

Module acts as a definition of some stored data and handles the interactions with the database. A Django model is a Python class that outlines the variables and methods for a particular type of data.

Template is simply an HTML page with a few extra placeholders. Django’s template language can be used to create various forms of text files like XML, email, CSS, JavaScript, CSV and etc.

View ties the model to the template. The view is where you write the code that actually generates the web pages. It determines what data is to be displayed, retrieves tha data from the database and passes the data to the template.

1. What is the function of URL patterns in Django?

URL patterns are a way of mapping the URLs to the views that should handle the URL requests. The URLs requested by the user are matched with the URL patterns and the view corresponding to the pattern that matches the URL is used to handle the requests. The URL patterns are constructed using expressions which are corresponds to the root of the website or the home page. The admin site also requires URL pattern.

1. What is the purpose of an Amazon AutoScaling group? Describe the steps involved in creating an AutoScaling group.

Answer: Amazon AutoScaling allows automatically scaling Amazon EC2 capacity up or down according to user defined conditions. So users can increase the number of EC2 instances running their applications seamlessly during spikes in the application workloads to meet the application performance requirements and scale down capacity when the workloads is low to save costs. It can be used for auto scaling IoT applications and IoT platforms deployed on Amazon EC2. An Amazon AutoScaling group has the policies for scaling up and scaling down.

Steps involved in in creating an AutoScaling group includes: First, establish the connection to AutoScaling service by calling boto.ec2.autoscale.connect\_to\_region function. Second, create a new launch configuration by calling conn.create\_launch\_configuration. Third, creat AutoScaling group by calling conn.create\_auto\_scaling\_group, the launch configuration is associated with that group. Then define the policies for scaling up and scaling down. Finally we can create Amazon CloudWatch alarms that will trigger these policies.

1. What is Amazon DynamoDB? Describe an application that can benefit from Amazon DynamoDB.

Answer: Amazon DynamoDB is a fully-managed, scalable, high performance No-SQL database service. It can serve as a scalable data store for IoT systems. With DynamoDB any amount of data can be stored and any amount of data can be stored and a level of requests for the data can be served. It has a lower delay (several milliseconds), that means it is suitable for applications that need a stable performance under any user size.

For example, for an online game application, the number of users may various from time to time. Then dynamic storage and a low level of delay is required even though there are huge numbers of users, using DynamoDB can solve this problem because it could adjust the resource allocation according to the need of user, then with any amount of user that generate any amount of data and requests this application would have a stable good performance.

1. Describe the use of Amazon Kinesis for IoT.

Answer: Amazon Kinesis is a fully managed commercial service that allows real-time processing of streaming data. Kinesis scales automatically to handle high volume streaming data coming from large number of sources. The streaming data collected by Kinesis can be processed by applications running on Amazon EC2 instances or any other compute instance that can connect to Kinesis. It is well suited for IoT systems that generate massive scale data and have strict real-time requirements for processing the data. It also allows rapid and continuous data intake and support data blobs for size up to 50Kb. For IoT, Amazon Kinesis provides efficient processing of massive scale data with high processing speed and then the data can be processed by other applications.

1. What are the uses of messaging queues? What are the message formats supported by amazon SQS?

Answer: Messaging queues are used to exchange messages between various application components. It is a container that keeps the message during the transmission. After connecting to an SQS queue, a program can either write message to or read message from that queue. Amazon SQS offers a highly scalable and reliable hosted queue for storing message as they travel between distinct components of applications. It guarantees only that messages arrive, which means the message may arrive in a different order in which they were put in the queue. It is simply a queue system that stores and releases messages in a scalable manner.

1. What does a MapReduce job comprise of?

Answer: MapReduce is a parallel data processing model for processing and analysis of massive scale data. This model has two phases: Map and Reduce. MapReduce programs are written in a functional programming style to create Map and Reduce functions. The input data to the map and reduce phases is in the form of key-value pairs. To start the job, a job name, locations of the mapper and reducer is needed.

1. What protocols dose the SkyNet messaging platform support?

SkyNet is an open source instant messaging platform for IoT, it support both HTTP REST and real-time WebSockets.