

# Hospital Quality Management Distributed Artifact Repository

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SE Project  
MTech 2014



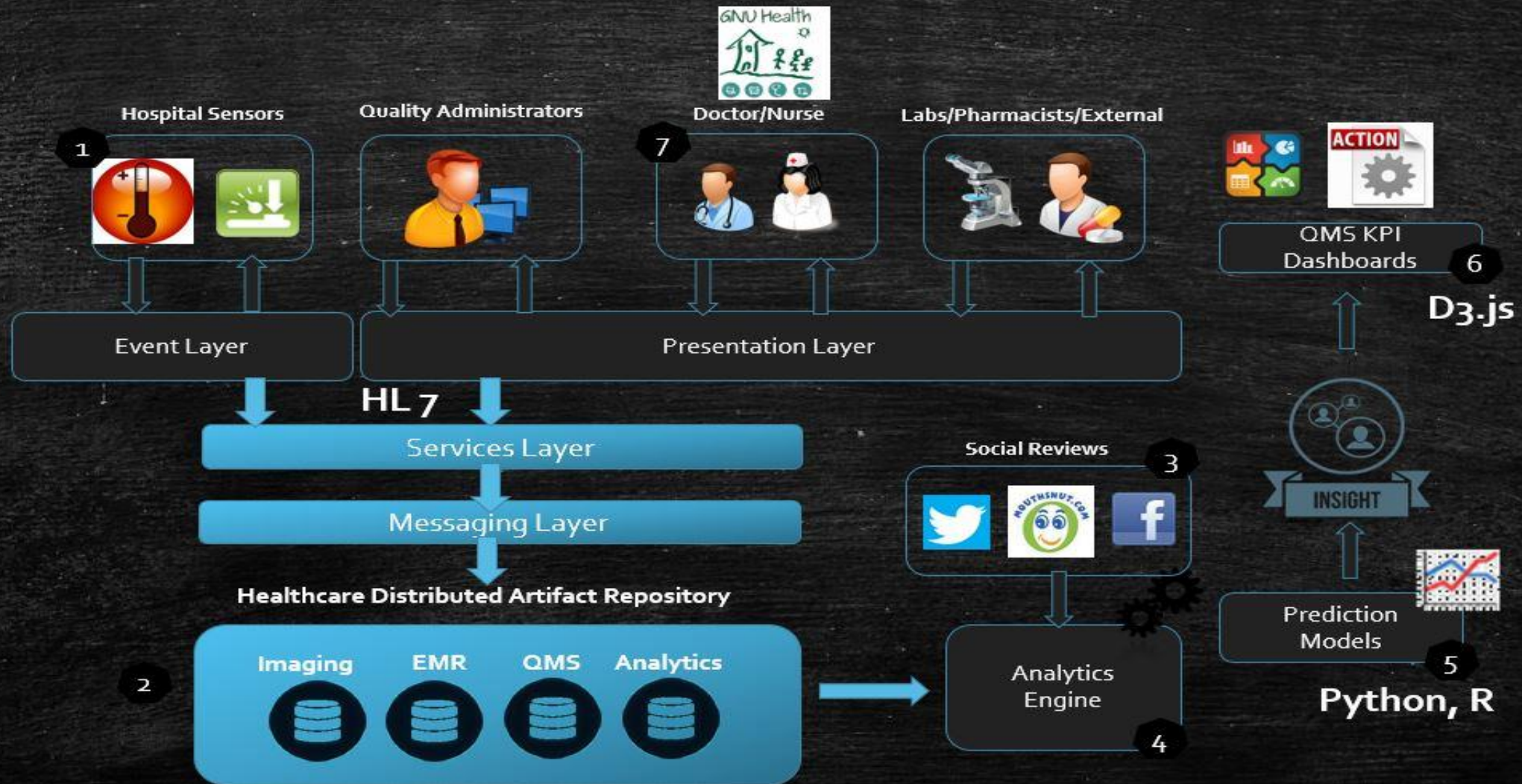
# Team

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- Nupur Garg (MT2014081)
- Setu Patani (MT2014085)
- Shaily Sanghvi (MT2014102)
- Dhruvik Shah (MT2014110)



# High Level Architecture





# Problem Statement

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- Building a cloud-based repository for healthcare system.
- Repository should be able to receive data (HL7 Messages) from various health care devices and store it in repository.
- On the request by various devices or analytic application, provide appropriate data in Json or XML format.



# Approach

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- Exploring Medical records and its structure.
- Standard for message passing-HL7 Message, between healthcare device and server.
- Find Persistent Storage mechanism for storing HL7 message on AWS.
- Implementation of Queue for handling incoming messages.
- Implementation for centralized web data store (AWS cloud).



# Technology Used

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- Java
- AWS EC<sub>2</sub>
- AWS SQS
- HAPI
- MongoDB
- Data Format
  - HL7
  - Json

# Flow of Project

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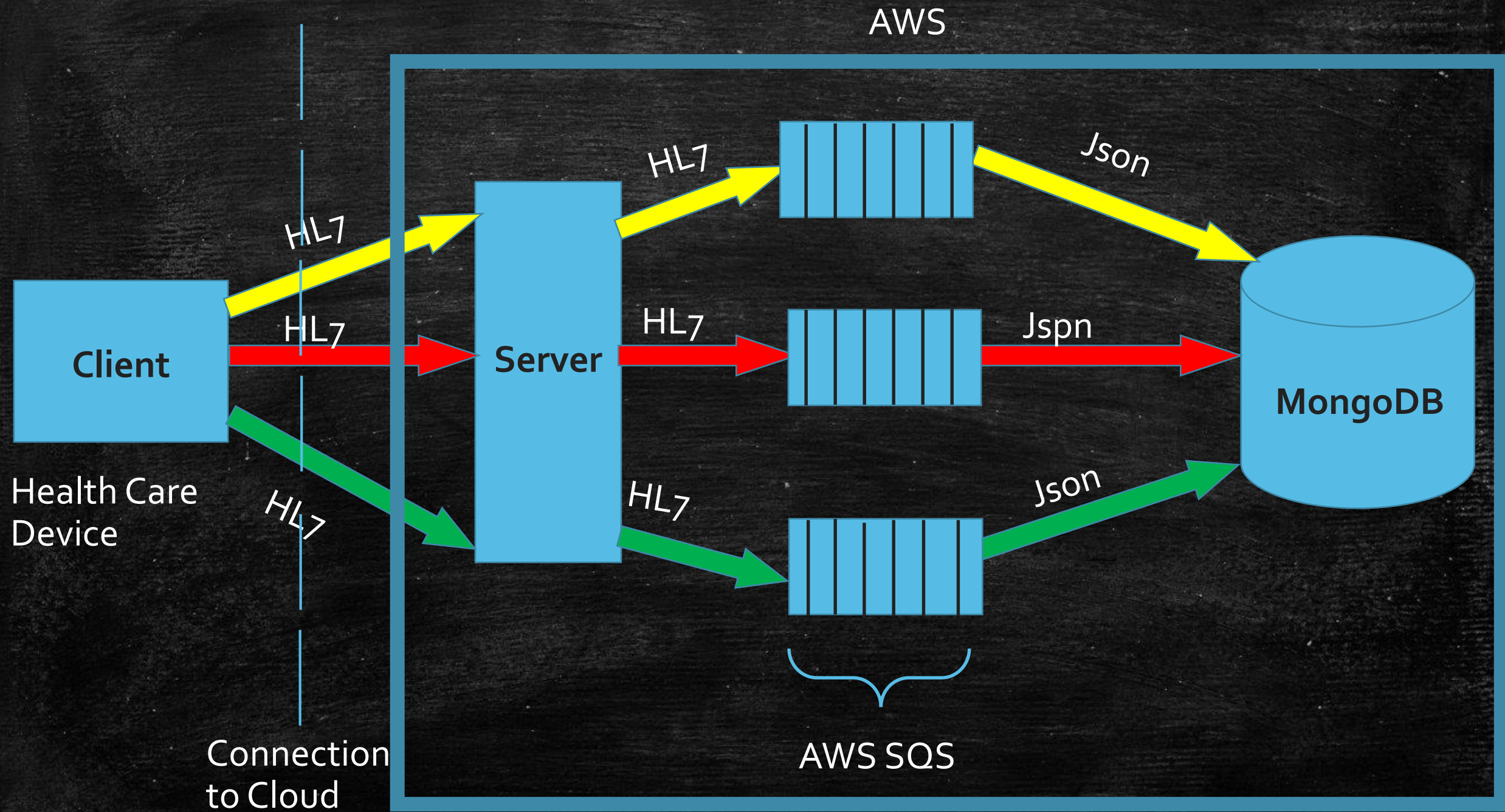
Receiving HL7 Message from IOT devices by calling web services.

Receiving HL7 messages and queue and process on AWS.

Decoding HL7 to Json.

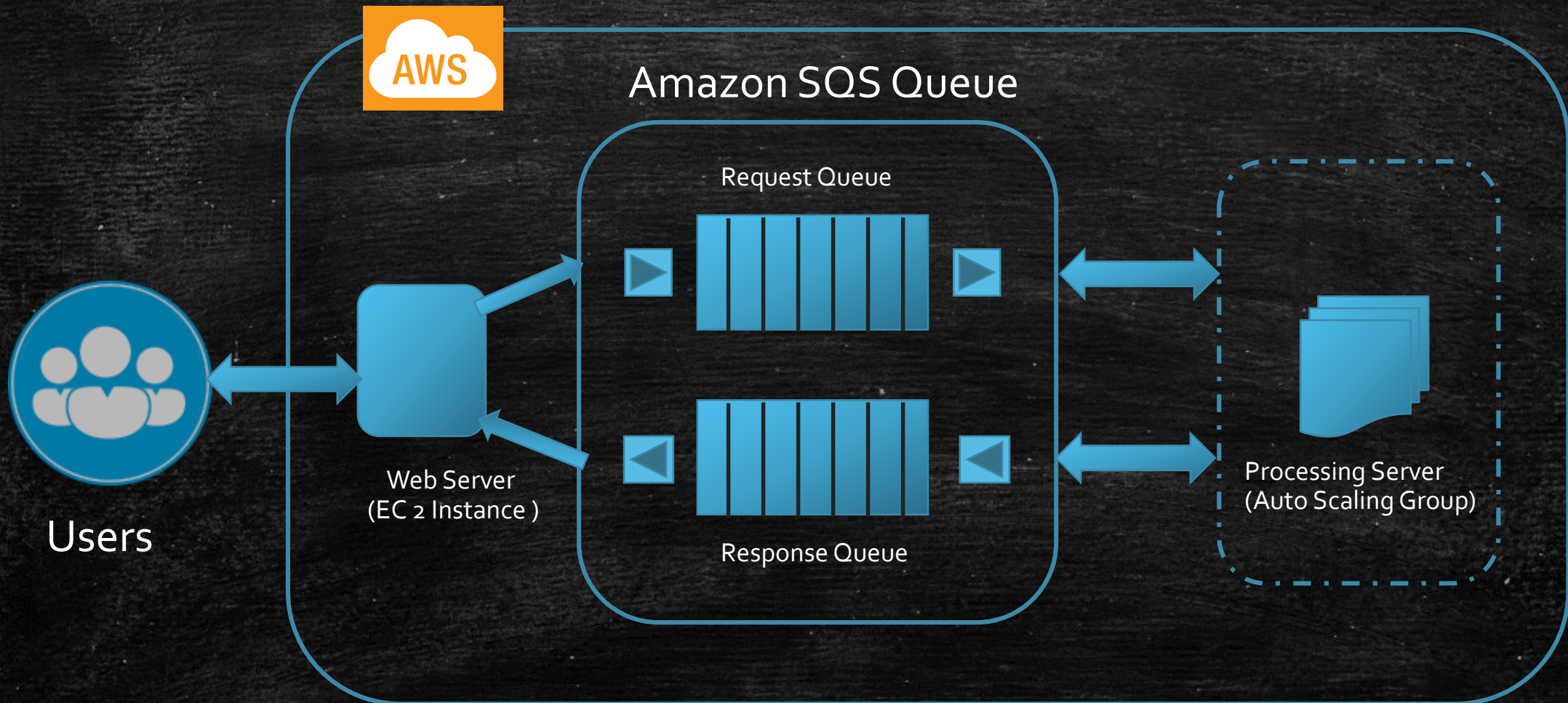
Storing Decoded HL7 in MongoDB.







# Scaling Based on Amazon SQS



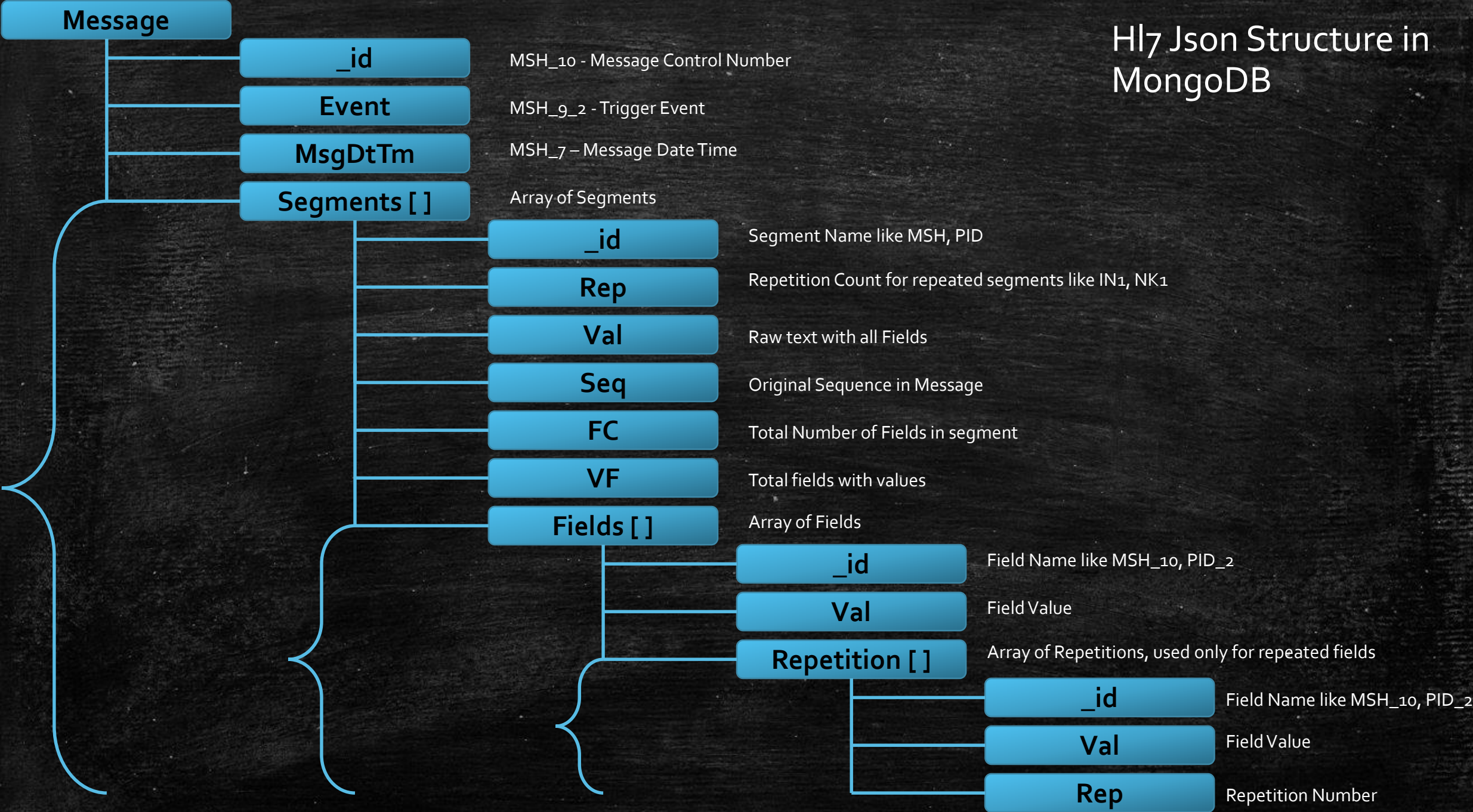


## HL7 Message

MSH|^~\&|ADT|ADI|ADT-1|ADI-1|20050215||ADT^A01|MSGADT003|T|2.4  
EVN|A01|20031016000000  
PID|1|111222333|H123123^^^^MR^ADT~111-222-333^^^^SS^ADT||John^Smith|GARSEN^^Melissa|19380818|M||2028-9|241 AVE^^Lake  
City^WA^98125^^^^100|100|(425)111-2222|(425)111-2222||S|CHR|1234567|111-222-333  
NK1|2|GARSEN^Melissa  
PV1|1|E||||D123^Jeff^Carron||MED||||7||D123^Jeff^Taylor|E|3454|R^20050215||||||||||||||EM||||20050215  
IN1|1|I123|ICOMP1|INS COMP 1|PO BOX 1^^Lake City^WA^98125|||||||1|John^Smith|01|19380818  
IN2|1||RETIRED  
IN1|2|I456|ICOMP2|INS COMP 1|PO BOX 2^^Lake City^WA^98125|||||||8|John^Smith|01|19380818  
IN2|2||RETIRED



# HL7 Jsn Structure in MongoDB





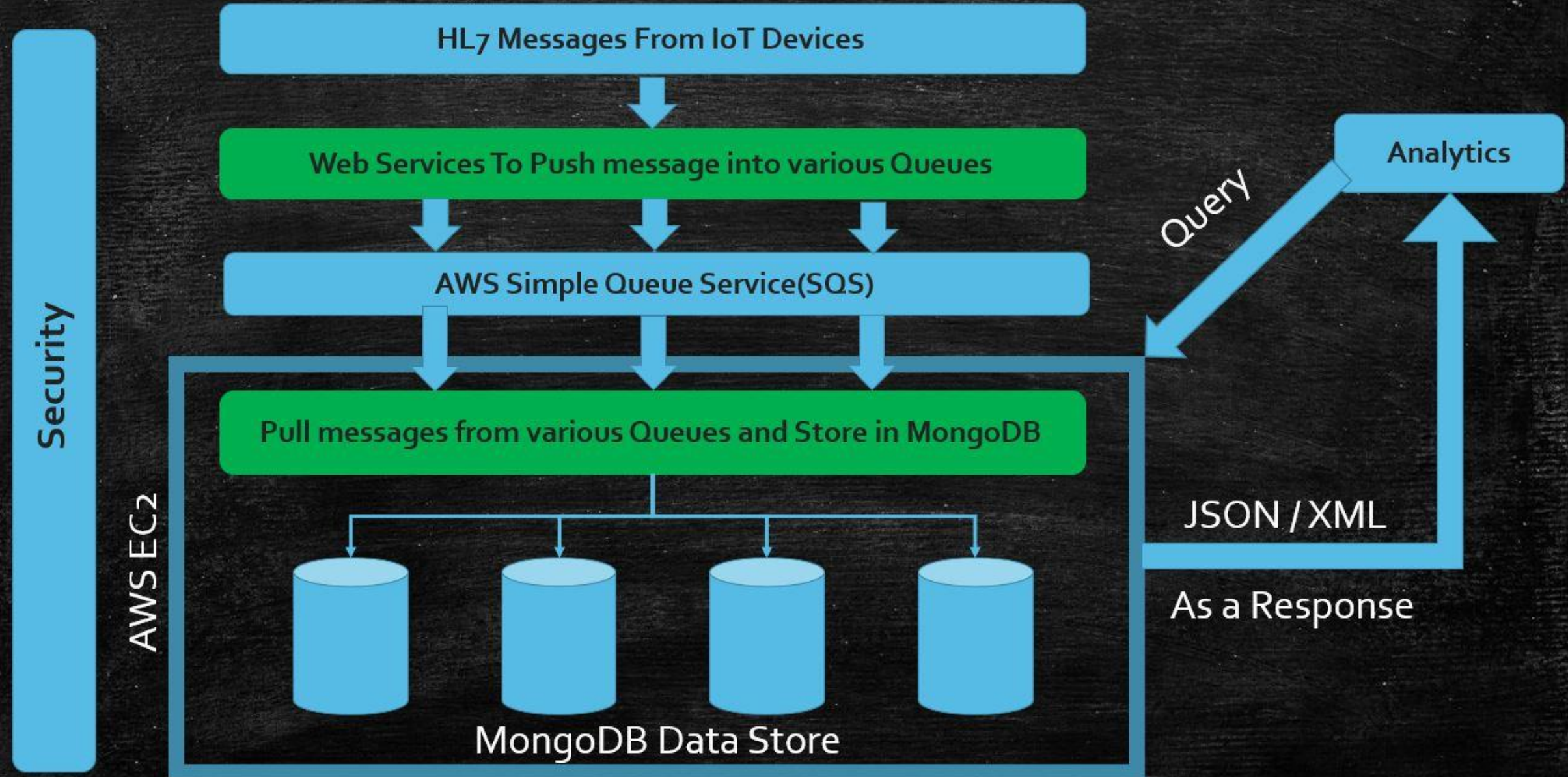
# Result of Study

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- HL7 Messages are used to transfer electronic data between disparate healthcare systems. Thus, HL7 format is used.
- HAPI is an open source, OO HL7 parses for JAVA.
- Companies in the healthcare sector are building applications on MongoDB to reduce costs, meet compliance standards and improve healthcare outcomes.
- AWS : Elastic, Cost Effective, Reliable, Flexible, Secure.
- An architecture is proposed on the basis of above mentioned parameters.



# Architecture









# Future Scope

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- As currently developed system is flexible and scalable, it can be extended to include various data format like,
  - All HL7 format
  - Images
  - EMR
  - QMS
  - Analytics
- Integration with other modules.





Nupur Garg  
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Shaily Sanghvi  
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