Clifford, Dustin & Chattopadhyay, Ritwick

MGM Resorts

Customer Service

Perpetual Offer – Detailed Design

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# Document Information

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| Author(s) | Dustin Clifford & Chattopadhyay, Ritwick |
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# Summary

**Customer Value Service** is being developed to provide access to information about a customer’s value to **MGM Resorts**. This service will provide a value for each **MGM** customer at each property in our portfolio. This valuation will be used to provide customers access to complimentary rooms or preferred rates based on the spending behavior of that customer when staying at **MGM** properties.

The values will be obtained from customer valuation calculations performed on gaming and other spending behavior obtained from **MGM** gaming, entertainment and other applicable systems. These values are calculated and then made available via database tables from which a **Data Pipeline** will pull and then update the values in **Customer Value Service**.

This service will provide values that will be used in pricing and value adds for both Las Vegas and Regional Properties.

More information can be found in the [**Perpetual Offer HLA**](#POHLAAnchor).

# Customer Value Service Design

## Components



Figure 1 - Customer Value Service Components

### Customer Value Web Service

#### Technology

|  |  |
| --- | --- |
| Aspect | Technology |
| Language | Java 8 - <http://www.oracle.com/technetwork/java/javase/overview/java8-2100321.html> |
| API Spec Management | Swagger - <https://swagger.io/> |
| Service Framework | Springboot - <https://spring.io/projects/spring-boot> |
| IoC Framework | Spring - <https://spring.io/> |
| Logging Framework | Slf4j / Logback - https://www.slf4j.org/manual.html |
| Container Framework | Container Engine: Docker  Orchestration: Kubernetes |
| Configuration Mgmt | Consul |
| Testing Frameworks | Unit Testing: Junit 5 - <https://junit.org/junit5/>  Mock: JMockit - <http://jmockit.github.io/>  API / Integration Tests: <https://www.getpostman.com/> |
| Monitoring & Altering | Monitoring / Alerting: CA APM  Time Series: Granfana |
| API Gateway | CA APIM - <https://www.ca.com/us/products/api-management.html> |
| Access Control | OAuth via Okta |

### Customer Value Service Model



Figure 2 - Class Diagram

#### Customer Class

|  |  |  |
| --- | --- | --- |
| Attribute | Type | Description |
| ccid | Long | The Corporate Customer ID is a correlation ID used to connect customers across various source systems at MGM. This value is a correlation ID used to connect customer records across the multiple source systems.  **Note: This value can be used across multiple MLife accounts. Also, this value can exist without an MLife number** |
| mlifeNumber | Long | This is the ID for a customer’s MLife account. |
| customerOffers | Map<Integer, List<[CustomerOffer](#CustomerOfferClassAnchor)>> | A list of offers made available to the customer at the property referenced by the key. See the [**CustomerOffer**](#CustomerOfferClassAnchor)class for more information. |
| customerGrades | Map<Integer, [CustomerGrade](#CustomerGradeClassAnchor)> | [**CustomerGrade**](#CustomerGradeClassAnchor) by **Property ID**. This will contain the Power Rank, **Power Value**, **Dominant Play** and **Segment** for the customer. |
| tier | [CustomerTier](#CustomerTierEnumerationAnchor) | An enumeration representing the tier of the customer. |
| createdDate | Date | The date that this customers value was originally loaded into Customer Value Service. |
| createdBy | String | The user or system that created the Customer Value. |
| updateDate | Date | The date the Customer Value was last updated. |
| updatedBy | String | The user or system that created the Customer Value. |
| version | Integer | Version is used to ensure that updates to Customer Value aren’t out of date and take into account the latest values stored. |

#### CustomerOffer Class

|  |  |  |
| --- | --- | --- |
| Attribute | Type | Description |
| offerType | [OfferType](#OfferTypeEnumerationAnchor) | They type of offer that this value represents. |
| amount | Double | The value available to the customer for this [**OfferType**](#OfferTypeEnumerationAnchor). |

#### CustomerGrade Class

|  |  |  |
| --- | --- | --- |
| Attribute | Type | Description |
| powerRank | int | The **Power Rank** of this customer. This value is used to identify applicable Rank Programs during pricing. |
| powerValue | String | This is the customer’s **Power Value** that was used to establish the customer’s **Power Rank**. |
| dominantPlay | [DominantPlay](#DominantPlayEnumerationAnchor) | This is the dominant type of play the customer plays at a particular location. This is used to establish the type of Booking Limits that will be applied when restricting the number of complimentary values or preferred rates available to the customer during pricing. |
| segment | Integer | This is the value which determines which **Segment Based Pricing** programs the customer is eligible. This, also, determines the Resort Credit the customer gets by way of routing on the program chosen. |

#### OfferType Enumeration

|  |  |
| --- | --- |
| Enumeration | Description |
| RoomAllowance | Room Allownce offer types provide a value that will be used to determine how much the customer pays for a room. If the room-price is less than that of the allowance the customer will get a complimentary room. If the cost is greater than the room allowance, the room price will be discounted by the allowance subject to Casino Floor. Rounding rules will apply. |
| FreePlay | This offer is a display-only value used to show the customer the amount of free-play that will be made available to them should they book. |
| ResortCredit | This offer is a display-only value that will give show the customer the amount of resort-credit that will be given to them based on program routing for the Segment program for which they are eligible. |

#### DominantPlay Enumeration

|  |  |
| --- | --- |
| Enumeration | Description |
| Slots | The customer value is based mostly on spending on slots. |
| Table | The customer’s value is based mostly on Table play. |
| Poker | The customer’s value is based mostly on Poker play. |
| General | The customer’s value is based on overall spending (potentially including entertainment and dining). |

#### CustomerTier Enumeration

|  |  |
| --- | --- |
| Enumeration | Description |
| Sapphire | Customer is in Sapphire tier. |
| Noir | Customer is in Noir tier. |
| Gold | Customer is in Gold tier. |
| Pearl | Customer is in the Pearl tier. |
| Platinum | Customer is in the Platinum tier. |

### API

|  |  |  |
| --- | --- | --- |
| URL | HTTP Verb | Description |
| /customer/<version>/value/{mlifeNumber} | GET | Returns all customer grades and offers for all properties for which they have a value. |
|  | POST | Creates customer value for a customer. |
|  | PUT | Updates customer value |
| /customer/<version>/value/{mlifeNumber}/property} | GET | Returns customer grade and offers for a specified property |

### Customer Value Repository

#### Technology

|  |  |
| --- | --- |
| Aspect | Technology |
| DBMS | CosmosDB [Cassandra API] - <https://docs.microsoft.com/en-us/azure/cosmos-db/cassandra-introduction> |

#### Queries & Schema

* Q1 – Get customer value by MLife number
* Q2 – Get customers without MLife number by CCID

A screenshot of a cell phone

Description generated with very high confidence

Figure 3 - Customer Value Repo Chebotko

### Customer Value Consumer

#### Technology

|  |  |
| --- | --- |
| Aspect | Technology |
| Data Pipeline | Kafka - <https://kafka.apache.org/> |
| Language | Java 8 |
| App Framework | Springboot |
| IoC Framework | Spring |
| Message Format | Avro |
| Monitoring | APM (JMX) |

A screenshot of a cell phone

Description generated with very high confidence

Figure 4 - Customer Value Kafka Flow

The **CustomerValueConsumer** will process messages from the customer.values.v1 topic. This value will then be processed and inserted into the Cassandra keyspace for use by **CustomerValueService**.

The Kafka message will be in the following format.

|  |  |  |
| --- | --- | --- |
| JSON Key | Type | Description |
| ccid | int | Corporate Customer ID for the customer. This value will always be present and values can and should be stored using this even if MLife Number is not present. |
| mlifeNo | int | MLife Number represents a registered customer for which we will be able use this valuation to provide benefits. |
| propertyId | int | The Oracle Property ID for this customer’s valuation. |
| valueType | string | This value will be used by the messaging system to compact valuation messages.   * Vegas * Regional |
| dominantPlay | string | The dominant play of the customer at this property. The appropriate values are **Slots**, **Table**, **Poker** and **General**. |
| powerRank | int | This is the rank of the customer at this property. This value will be used in pricing and determining the appropriate Booking Limits to apply. This value can be absent if this property’s valuation is based on **Segment** pricing. |
| powerValue | string | This is a string representing the **Power Value** assigned to the customer. Currently, this is used in determining the **Power Rank** of a customer and not used in our valuations. This value should, however, still be stored. |
| segment | int | This is the customer **Segment** that will be used in segment based pricing. This value will not be present in the case of regional properties that use **Power Rank**. |
| roomAllowance | double | This is the amount that a customer should be credited when calculating room prices. This will indicate when/if the customer gets a complimentary room or a room at a reduced price (in conjunction with Booking Limits restrictions, of course). |
| cardTier | string | The tier of the customer. Applicable values include **Sapphire**, **Pearl**, **Gold**, **Platinum** and **Noir**. |
| freePlayAmount | double | This is the amount of **Free Play** that is available to the customer if they book a trip. This value is, currently, for display purposes only. |
| resortCredit | double | This is the amount of **Resort Credit** a customer will be given if they should book a trip. Currently, this field will be used for display purposes only. |

|  |
| --- |
| { "ccid": 192345, "mlifeNo": 123456, "propertyId": 123, "valueType": "<Vegas|Regional>", "dominantPlay": "<Slots|Table|Poker|General>", "powerRank": 2, "powerValue": 1200, "segment": 43, "roomAllowance": 25.00, "cardTier": "<Sapphire|Pearl|Gold|Titanium|Noir>", "freePlayAmount": 23.00, "resortCredit": 43.00 } |

Figure 5 - Customer Value Kafka Message Example

# OperatioNs

## Deployment



Figure 6 - CustomerValueService Deployment

**CustomerValueService** will be deployed as a Docker container. **Kubernetes** be the container orchestrator via **AKS** on **Microsoft Azure.**

The service will consume customer value data from the Customer Value data-source which will be populated via the combination of the producer and consumer processes. These producer and consumer processes will be triggered by the transfer of CVS files from **Information** **Management**. This will trigger a series of events that will caused the customer valuations to be consumed. This will be done using components of **Azure Data Factory** and the **Azure Blob Store**.

## Monitoring

### Customer Value Service

Should be monitored for:

* JVM
  + Heap utilization
  + Garbage collection
* Kubernetes
  + Number of nodes
  + CPU
  + Network
  + Memory utilization
* Service (Springboot Actuator)
  + Failure count (non 2xx response code)
  + Number of requests
  + Exception count

### Customer Value Consumer

* JVM
  + Heap utilization
  + Garbage collection
* Kubernetes
  + Number of nodes
  + CPU
  + Network
  + Memory utilization
* Service (Springboot Actuator)
  + Failure count
  + Number of requests
  + Exception count

### Cassandra

* DB
  + Throughput
    - Read/Write
  + Latency
    - Read/Write
    - Cache hit rate
  + Errors

# Reference Documentation

|  |  |
| --- | --- |
| Perpetual Offer Requirements | <https://mgmresorts-my.sharepoint.com/:w:/p/463082/EesMCkH44NNHlh_3YEpdJrQBGud-3NUDKl7qEwe3MUeGGw?e=GFLYBP> |
| Perpetual Offer HLA | <https://mgmresorts-my.sharepoint.com/:w:/p/463082/EUPZMV31961DqwSp2-cGuw4B1V2mzmpnTWOtROwHe1yBFw?e=UDxmdg> |

# Change Log

|  |  |  |
| --- | --- | --- |
| Changer | Date | Change Description |
| Dustin Clifford | June 8, 2018 | Initial creation |
| Dustin Clifford | June 10, 2018 | Added summary |
| Dustin Clifford | June 12, 2018 | Added in components, technology stack, etc. |
| Dustin Clifford | June 13, 2018 | Added component diagrams, class diagrams, technology stack information, etc. |
| Dustin Clifford | June 14, 2018 | CustomerValueService API information.  Began work on consumer design.  Deployment section. |
| Dustin Clifford | June 15, 2018 | Updated consumer section.  Monitoring section. |
| Dustin Clifford | July 16, 2018 | Updating to 1.0 |
| Dustin Clifford | August 26, 2018 | Updating design with some new considerations for Azure components being used.  Removed queries that are no longer being used.  Some other corrections. |