Web CRM Project

Logical Data Model

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The Data Organization

11 December 2007

DRAFT

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1. CHANGE LOG

Date	Description	Author
1 Sept 2007	Created document	Rainer Schoenrank
18 Oct 2007	Included Learning Path	Rainer Schoenrank
19 Nov 2007	Included DRM	Rainer Schoenrank
28 Nov 2007	Corrected Hierarchy tables with node name	Rainer Schoenrank
11 Dec 2007	Corrected Customer Contact and Customer Address	Rainer Schoenrank

2. DOCUMENT SIGN-OFF

Date	Role	Name	Signature
	Biz Analyst		
	EDW Analyst		

3. INTRODUCTION

3.1 Purpose of the Document

The *Logical Data Model* describes the Web CRM data model and its implementation. This report describes the results of the policy decisions that created the data model, the decomposition and organization of the business data, and the database implementation.

3.2 Scope of the Document

The scope of the document is limited to the logical data model for the Web CRM database. The level of detail is at the entity level with a description of properties of the entity and the relationships (or constraints) between the entities.

3.3 Naming Standards

All databases should follow a similar naming convention throughout the enterprise. The technical names will be constructed as described in:
DataBaseNamingConvention.doc

3.4 Organization of the Document

INTRODUCTION specifies the purpose, scope and organization of this document.

DATA MODEL OVERVIEW describes the context of the Web CRM data model, its functionality, and the organization of the business data.

"SUBSCHEMA" DATA the table and data chapters describe the detailed tables that make up the major components of the data model. There is a chapter for each of the entities of the database and for each of the measurement tables of the database.

IMPLEMENTATION OVERVIEW describes the environment for the development of the Web CRM application and the processes used to distribute the application to its users.

4. DATA MODEL OVERVIEW

4.1 Introduction

The Web CRM data model is based on the model for a business processing application that uses a database. The data model provides a common data definition for the data required by the application. The data model is a set of entities (or tables) that contain data produced by users within the business. The entities are described in a data dictionary that produces a file of Data Definition Language (DDL) commands for the target data base management system (DBMS).

4.2 Data Model Design Criteria

The goal of the data modeling process is to create a database that models the reality of the business data, is expandable as business changes and allows the data to be shared among business processes (different application system).

The design principles of the data model and database are:

- The model and implementation of the database will use Declarative Referential Integrity to ensure that orphan records cannot be created in the database.
- Company policy (business rules) will not be modeled or implemented into the database.
- The application owner will have full control of the data base update processing

The criteria used for designing the database are:

- Simplicity
- Clarity
- Ease of use
- Generality.

For simplicity, data modeling constructs that are not implemented in the DBMS are not used in the data model (such as, sub typing, super typing, and relationship roles).

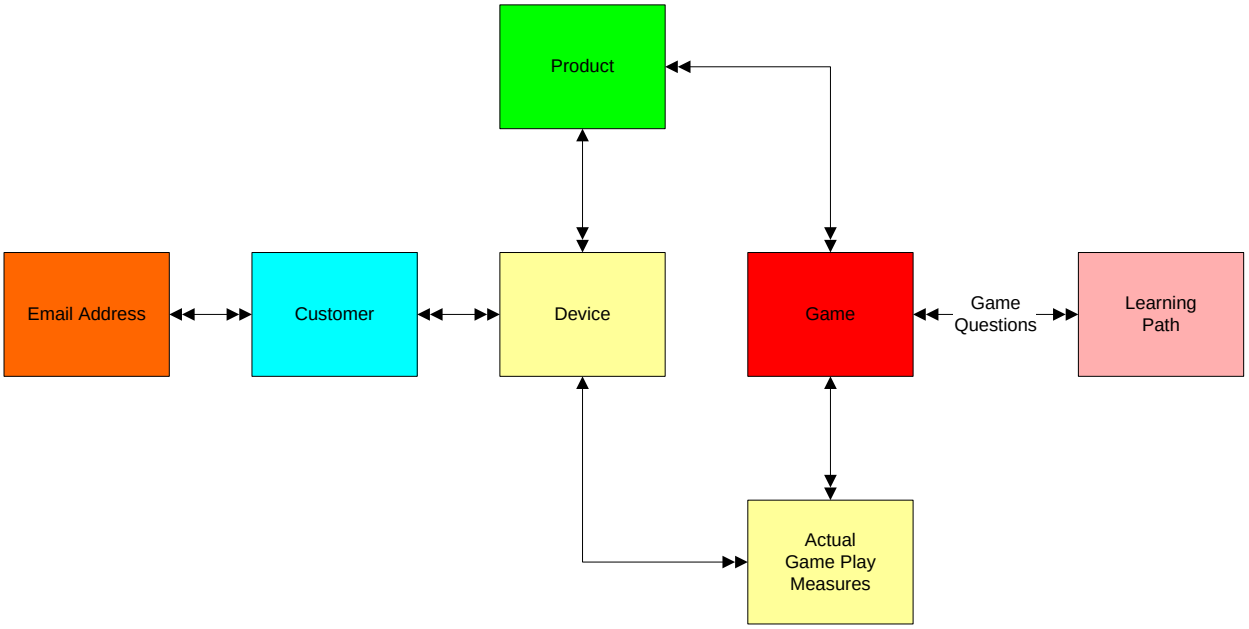
For clarity, validation tables are not modeled in the diagrams and separated from the model tables in the database implementation.

For ease of use, a data item will be modeled in only one place in the data model. This will avoid data synchronization problems and data redundancy (i.e., the data model will be in third normal form).

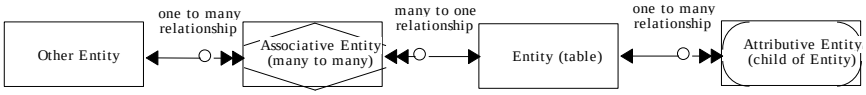
For generality, the requirements of the more general concept of a data item will be analyzed. For example, using telephone number, the requirements of the international phone system will be examined rather than just the North American telephone-numbering plan.

4.3 Conceptual Data Model

A data model is the logical view of the business data. It is physically implemented within a DBMS, but the model is independent of any particular DBMS implementation.



Legend:



5. CUSTOMER

5.1 Introduction

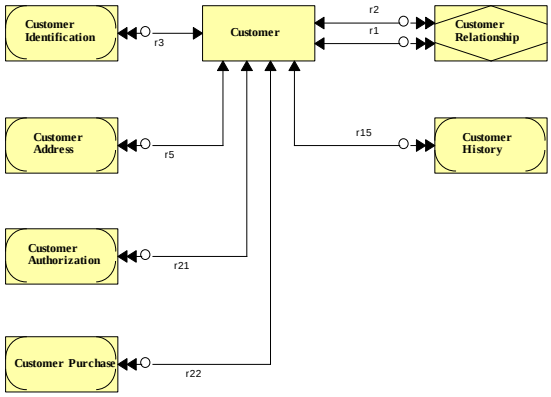
The Customer is a data object that contains the identification and description of all the persons that interact with the web application. These customers represent a self-selected subset of all of the customers. These customers can be individuals, groups of individuals, schools, classrooms, etc.

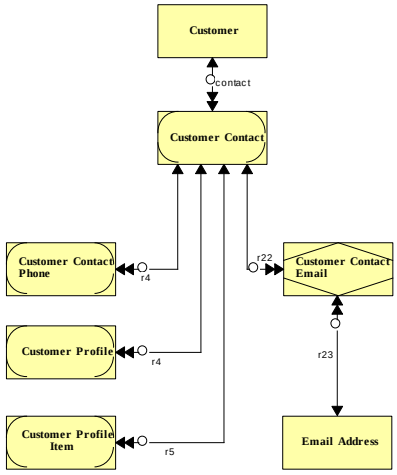
The Customer data object is a set of tables that contains all of the data about the Customers known to the business. The tables include data about:

- Customer (the time invariant data of customer)
- Customer to Customer relationships
- Customer identification (contains all the source application identifiers for customer)
- Customer history (the time varying data of customer, may be split into many histories that have different periods)

5.2 Data Model

The data required for customer so extensive, that the data model is shown in two parts, generic customer on this diagram and the customer contact (person) on the next diagram.





5.3 Customer

Entity Type:	Entity
Description:	The Customer is a business object that contains the identification and description of all the customers.
Alias:	WC_D_CUST
Composition:	[PK] customer key customer name description row meta data
Notes:	The Customer is a business object that contains the identification and description of all the customers that interact with us at the end of the production process. Customers are the ones that send us money for goods, services, or information. Or they sent us money in the past. Or we expect them to send us money in the future. These customers can be individuals, other businesses, the governments, the business itself, its subsidiaries, etc. The list of valid customers always includes the 'SYSTEM DEFAULT' customer so that measurement and forecast transactions that do not include a "real" customer can still establish an integrity checked relationship.
Assumptions:	Customer name uniquely identifies a customer within the business A customer can sign on to the our web site

5.4 Customer Address

Entity Type:	Attributive Entity
Description:	Contains the list of customer addresses such as billing address, shipping address, etc.
Alias:	WC_D_CUST_ADDR
Composition:	[PK] [FK] customer key [PK] customer address key customer address type customer address row meta data
Notes:	
Assumptions:	

5.5 Customer Authorization

Entity Type:	Attributive Entity
Description:	The record of the customer's password for an application
Alias:	WC_D_CUST_AUTH
Composition:	[PK] [FK] customer key [PK] application id user name failed login attempts first failed date password policy type password hint password change date password change indicator password last login date internet permission learning path permission shopping permission description row meta data
Notes:	
Assumptions:	

5.6 Customer Contact

Entity Type:	Attributive Entity
Description:	Contains the list of people at the customer that can be contacted
Alias:	WC_D_CUST_CNTCT
Composition:	[PK] [FK] customer key [PK] customer contact key customer contact type customer contact salutation row meta data
Notes:	
Assumptions:	

5.7 Customer Contact Email

Entity Type:	Associative Entity
Description:	Contains the list of email addresses for this customer person
Alias:	WC_D_CUST_CNTCT_EMAIL
Composition:	[PK] [FK] customer key [PK] [FK] customer contact key [PK] [FK] email local [PK] [FK] email domain [PK] email type description row meta data
Notes:	
Assumptions:	

5.8 Customer Contact Phone

Entity Type:	Attributive Entity
Description:	Contains the list of phone numbers for the customer contact
Alias:	WC_D_CUST_CNTCT_PHN
Composition:	[PK] [FK] customer key [PK] [FK] customer contact key [PK] customer phone type contact phone time zone row meta data
Notes:	
Assumptions:	

5.9 Customer History

Entity Type:	Attributive Entity
Description:	Contains the customer attributes that are time dependent, such as type, class and location
Alias:	WC_D_CUST_HIST
Composition:	[PK] [FK] customer key [PK] time interval customer type legal entity type description row meta data
Notes:	Each row in the table is for a specified time interval. A customer's history records cover the entire period of history with no gaps or overlaps.
Assumptions:	A customer has at least one history record

5.10 Customer Identification

Entity Type:	Attributive Entity
Description:	Contains the identification of a customer by external entities such as legal jurisdictions or application systems
Alias:	WC_D_CUST_ID
Composition:	[PK] [FK] customer key [PK] customer identification time interval description row meta data
Notes:	
Assumptions:	

5.11 Customer Profile

Entity Type:	Attributive Entity
Description:	Contains the customer demographic data
Alias:	WC_D_CUST_PRFL
Composition:	[PK] [FK] customer key [PK] profile date age gender type race ethnicity geographic location education household income description row meta data
Notes:	
Assumptions:	

5.12 Customer Profile Item

Entity Type:	Attributive Entity
Description:	Contains the customer interest, skill, etc., data
Alias:	WC_D_CUST_PRFL_ITM
Composition:	[PK] [FK] customer key [PK] [FK] time interval [PK] profile item type [PK] profile item value sort order description row meta data
Notes:	
Assumptions:	

5.13 Customer Purchase

Entity Type:	Attributive Entity
Description:	The list of applications purchased by a customer
Alias:	WC_D_CUST_PURCH
Composition:	[PK] [FK] customer key [PK] product key [PK] time interval purchase type [AK1] license key license count description row meta data
Notes:	
Assumptions:	

5.14 Customer Relationship

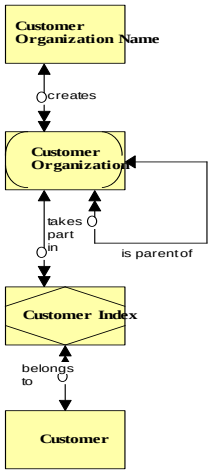
Entity Type:	Associative Entity
Description:	The customer relationship contains the list of relationships between one customer and any other customer, i.e. between a child and the parent
Alias:	WC_D_CUST_RELAT
Composition:	[PK] [FK] from customer [PK] [FK] to customer [PK] customer relationship type description row meta data
Notes:	
Assumptions:	

6. CUSTOMER SEGMENTATION

6.1 Introduction

The Customer Segmentation is a data object that contains the identification and description of all categories into which the Customer data object can be placed. There can be different customer categories for each purpose envisioned system used by us (e.g., Sales, Logistics, Marketing, etc.).

6.2 Data Model



6.3 Customer Organization Name

Entity Type:	Entity
Description:	The entity contains the list of names of the hierarchies used to organize customers
Alias:	WC_D_CUST_ORG_NM
Composition:	[PK] customer organization code customer organization name description sort order maximum depth row meta data
Notes:	
Assumptions:	

6.4 Customer Organization

Entity Type:	Attributive Entity
Description:	The customer organization contains the hierarchy trees for each named customer organization
Alias:	WC_D_CUST_ORG
Composition:	[PK] [FK] customer organization code [PK] customer organization key [FK] parent node name description sort order row meta data
Notes:	The Customer Organization is a business object that contains the identification and description of all categories into which the Customer data entity can be placed. A single customer can be related to many categories and a single category can be related to many customers. There can be a different customer organization for each operational application system used by the business (e.g., Sales, Logistics, Finance, etc.).
Assumptions:	

6.5 Customer Index

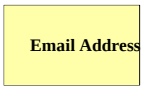
Entity Type:	Associative Entity
Description:	The customer index is the relationship between the customer and all of the named customer hierarchies
Alias:	WC_D_CUST_INDX
Composition:	[PK] [FK] customer organization code [PK] [FK] customer organization key [PK] [FK] customer key description row meta data
Notes:	The Customer Index is a many to many relationship between Customer and the way in which customers are organized into groups (segmentation). This relationship allows a customer to be related to many groups and a single group can be related to many customers. There can be a different customer groups for each type of customer analysis done by us (e.g., Sales, Logistics, Marketing, etc.).
Assumptions:	

7. EMAIL ADDRESS DATA

7.1 Introduction

The email address data object contains the list of valid email addresses. These email addresses form the basis of the email marketing campaigns. There is a many to many relationship between a Customer contact person and an email address.

7.2 Data Model



7.3 Email Address

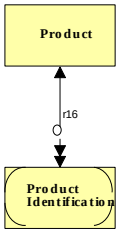
Entity Type:	Entity
Description:	Contains the list of valid email addresses
Alias:	WC_D_EMAL_ADDR
Composition:	[PK] email local [PK] email domain marketing opt in opt in date verify opt in verify date opt out opt out date description row meta data
Notes:	
Assumptions:	There is only one reader at each email address

8. PRODUCT DATA

8.1 Introduction

Product is a data object that contains all of the data (identification and detailed specifications) of all the tangible goods, information or services that the business plans to sell. Product is a list of the items available to be sold by the business.

8.2 Data Model



8.3 Product

Entity Type:	Entity
Description:	Product is a business object that contains the identification, description, specification and prices of all the Products
Alias:	WC_D_PROD
Composition:	[PK] product key product name product type targeted gender start age end age description row meta data
Notes:	Product is a business object that contains the identification, description, specification and prices of all the Products that we have sold in the past, are selling currently or plan to sell in the future. There are three categories of product Physical (goods) service information The products include shipping services, handling services, and third party products such as taxes that are resold for government vendors. The list of valid Products always includes the 'SYSTEM DEFAULT' Product so that measurement and forecast transactions that do not include an "actual" Product can still establish an integrity checked relationship.
Assumptions:	

8.4 Product Identification

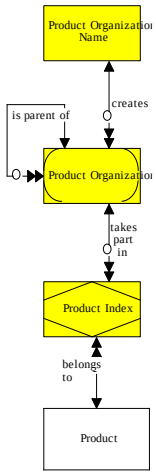
Entity Type:	Attributive Entity
Description:	The type of identification of the product
Alias:	WC_D_PROD_ID
Composition:	[PK] [FK] product key [PK] product identification time interval description row meta data
Notes:	
Assumptions:	

9. PRODUCT CATALOG DATA

9.1 Introduction

The Product Catalog is a data object that contains the identification and description of all categories into which the Device data object can be organized, such as catalogs, product families, etc.

9.2 Data Model



9.3 Product Organization Name

Entity Type:	Entity
Description:	The entity contains the list of names of the hierarchies used to organize products
Alias:	WC_D_PROD_ORG_NM
Composition:	[PK] product organization code product organization name description sort order maximum depth row meta data
Notes:	
Assumptions:	

9.4 Product Organization

Entity Type:	Attributive Entity
Description:	The product organization contains the hierarchy trees for each named product organization
Alias:	WC_D_PROD_ORG
Composition:	[PK] [FK] product organization code [PK] product organization key [FK] prnt21 node name description sort order row meta data
Notes:	The Product Organization is a business object that contains the identification and description of all categories into which the Product data entity can be placed. A single product can be related to many categories and a single category can be related to many products.
Assumptions:	

9.5 Product Index

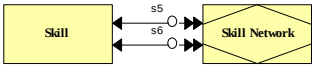
Entity Type:	Associative Entity
Description:	The product index is the relationship between the product and all of the named product hierarchies
Alias:	WC_D_PROD_INDX
Composition:	[PK] [FK] product organization code [PK] [FK] product organization key [PK] [FK] product key description row meta data
Notes:	The Product to Product Organization relationship is a many to many relationship between product and the way in which products are organized. This relationship allows the product to be placed into many product groupings and a product grouping to gather together many products. The only restriction is that a single product can be classified only once for each product group.
Assumptions:	

10. SKILL DATA

10.1 Introduction

The Skill is a data object that contains the identification and description of the fundamental components of a Learning Path or curriculum. The skill is the common thing that is expected to be taught across all the games or lessons. Skills are related to other skills as prerequisite and/or complementary skills.

10.2 Data Model



10.3 Skill

Entity Type:	Entity
Description:	The list of the skills that are the educational objectives of the learning path
Alias:	WC_D_SKIL
Composition:	[PK] skill code skill type skill name skill level description start age end age row meta data
Notes:	
Assumptions:	

10.4 Skill Network

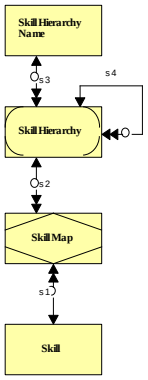
Entity Type:	Associative Entity
Description:	The list of relationships among the skills
Alias:	WC_D_SKIL_NETWK
Composition:	[PK] [FK] from skill [PK] [FK] to skill [PK] skill network type description sort order row meta data
Notes:	
Assumptions:	

11. LEARNING PATH DATA

11.1 Introduction

The Learning Path is way to organize Skills into a curriculum. The Skill to Learning Path relationship is a many to many relationship between a Skill description and the way in which the Skills are organized into Learning Paths. This relationship allows the Skill to be placed into many learning paths and a learning path to use many skills. By collecting the relationships, one can draw the graph of how the skills interact.

11.2 Data Model



11.3 Skill Hierarchy Name

Entity Type:	Entity
Description:	The list of names of the individual learning paths
Alias:	WC_D_SKIL_HIER_NM
Composition:	[PK] skill hierarchy code skill hierarchy name description sort order maximum depth row meta data
Notes:	
Assumptions:	

11.4 Skill Hierarchy

Entity Type:	Attributive Entity
Description:	The learning path organization (tree) of the skills
Alias:	WC_D_SKIL_HIER
Composition:	[PK] [FK] skill hierarchy code [PK] skill hierarchy key [FK] parent41 node name description sort order row meta data
Notes:	
Assumptions:	

11.5 Skill Map

Entity Type:	Associative Entity
Description:	The list of relationships between the skill and the learning path (skill organization)
Alias:	WC_D_SKIL_MAP
Composition:	[PK] [FK] skill hierarchy code [PK] [FK] skill hierarchy key [PK] [FK] skill code [PK] time interval description sort order row meta data
Notes:	
Assumptions:	

12. GAME DATA

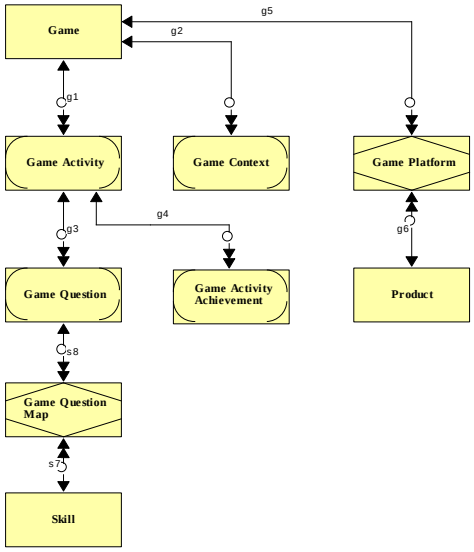
12.1 Introduction

The Game is a data object that contains the identification and description of all the games (software programs) that interact with a particular device. The interaction between the customer and the game produces the web events of the customer's actual game play.

The game data object is a set of tables that contains all of the data about the game that a customer can use. The tables include data about:

- The Game
- Game identification
- Game specification
- Game structure (Levels, activities, etc.)

12.2 Data Model



12.3 Game

Entity Type:	Entity
Description:	The identification of the games that can be played and logged on the web site
Alias:	WC_D_GAME
Composition:	[PK] game key game type game name start age end age game log id description row meta data
Notes:	
Assumptions:	

12.4 Game Activity

Entity Type:	Attributive Entity
Description:	The list of activities that make up the game for the device
Alias:	WC_D_GAME_ACTV
Composition:	[PK] [FK] game key [PK] game activity key description game activity log id sort order row meta data
Notes:	
Assumptions:	

12.5 Game Activity Achievement

Entity Type:	Attributive Entity
Description:	The expected measurement to be achieved to have completed the game activity
Alias:	WC_D_GAME_ACTV_ACHV
Composition:	[PK] [FK] game key [PK] [FK] game activity key [PK] time interval min level max level levels time spent questions total questions attempted correct answers max hints description row meta data
Notes:	
Assumptions:	

12.6 Game Context

Entity Type:	Attributive Entity
Description:	The objectives and rules of a game
Alias:	WC_D_GAME_CNTXT
Composition:	[PK] [FK] game key [PK] game context key game objective game rule description row meta data
Notes:	
Assumptions:	

12.7 Game Platform

Entity Type:	Attributive Entity
Description:	Contains the list of compatible game platforms (e.g., operating systems)
Alias:	WC_D_GAME_PLTFRM
Composition:	[PK] [FK] game key [PK] [FK] product key [PK] platform type description row meta data
Notes:	
Assumptions:	

12.8 Game Question

Entity Type:	Associative Entity
Description:	The questions that are used in the game activity.
Alias:	WC_D_GAME_QUST
Composition:	[PK] [FK] game key [PK] [FK] game activity key [PK] sort order question type game level question text example text description game question log id row meta data
Notes:	
Assumptions:	

12.9 Game Question Map

Entity Type:	Associative Entity
Description:	The relationship between the game question and the learning path skill (i.e., the educational objective of the game question)
Alias:	WC_D_GAME_QUST_MAP
Composition:	[PK] [FK] game activity key [PK] [FK] game key [PK] [FK] sort order [PK] [FK] skill code description sequence weight row meta data
Notes:	
Assumptions:	

13. DEVICE DATA

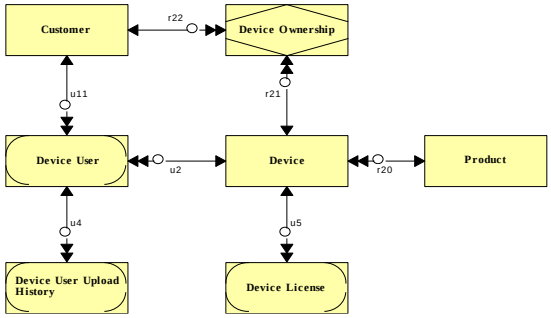
13.1 Introduction

The Device is a data object that contains the identification and description of the goods that a customer can register with us. This is a subset of all of our products. The list of valid Devices always includes the 'SYSTEM DEFAULT' Device so that web events that do not include an "actual" Device can still establish an integrity checked relationship.

The Device data object is a set of tables that contains all of the data about the Devices that a customer can register with us. The tables include data about:

- Device
- Device identification
- Device users
- Device user upload history

13.2 Data Model



13.3 Device

Entity Type:	Entity
Description:	Contains the list of devices that the customer has declared a relationship to, e.g., registered, purchased, earned, etc
Alias:	WC_D_DEVC
Composition:	[PK] device key [FK] product key device type device serial number description row meta data
Notes:	
Assumptions:	

13.4 Device License

Entity Type:	Associative Entity
Description:	the history of licenses on this device
Alias:	WC_D_DEVC_LIC
Composition:	[PK] [FK] device key [PK] time interval [PK] [FK] license key license indicator description row meta data
Notes:	
Assumptions:	

13.5 Device Ownership

Entity Type:	Associative Entity
Description:	The entity contains the information about the relationship between a device and a customer
Alias:	WC_D_DEVC_OWNR
Composition:	[PK] device key [FK] customer key [FK] time interval ownership type description row meta data
Notes:	
Assumptions:	

13.6 Device User

Entity Type:	Attributive Entity
Description:	The name and identification of a device user.
Alias:	WC_D_USER
Composition:	[PK] [FK] device key [PK] user key [FK] customer key user name user number description row meta data
Notes:	
Assumptions:	someone that uses our device or plays our game

13.7 Device User Upload History

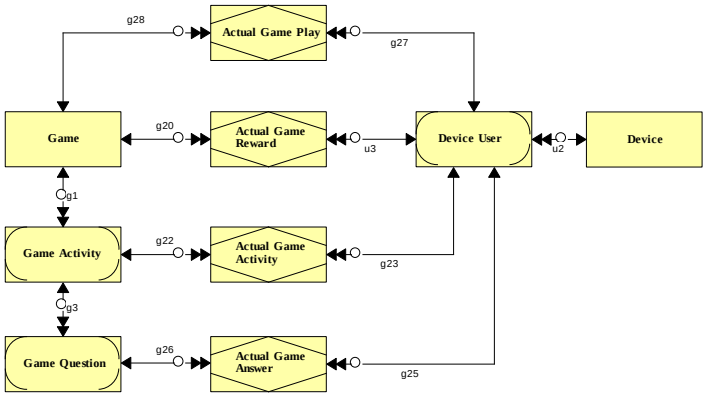
Entity Type:	Attributive Entity
Description:	The history of the device logs uploaded for the user
Alias:	WC_D_USER_UPLD_HIST
Composition:	[PK] [FK] device key [PK] [FK] user key [PK] log file id device upload date PC_APP upload date server name directory path name file name description row meta data
Notes:	
Assumptions:	

14. ACTUAL GAME PLAY DATA

14.1 Introduction

The Actual Game Play Events (Actual Learning Path Events) are measurements that associate a game activity to the user that is playing the game. The tables contain the identification and description of the game play events generated by the customers while using the our web site. The data includes the answers to the questions used by the games.

14.2 Data Model



14.3 Actual Game Play

Entity Type:	Associative Entity
Description:	The record of the time spent connected to a game.
Alias:	WC_F_ACTL_GAME_PLAY
Composition:	[PK] [FK] device key [PK] [FK] user key [PK] [FK] game key [PK] game date [PK] game time time spent log file id description row meta data
Notes:	
Assumptions:	

14.4 Actual Game Reward

Entity Type:	Associative Entity
Description:	The record of the rewards accumulated during a game play.
Alias:	WC_F_ACTL_GAME_REWARD
Composition:	[PK] [FK] device key [PK] [FK] user key [PK] [FK] game key [PK] game date [PK] game time reward description log file id expiry date row meta data
Notes:	
Assumptions:	

14.5 Actual Game Activity

Entity Type:	Associative Entity
Description:	The measurements of the game play by game activity.
Alias:	WC_F_ACTL_GAME_ACTV
Composition:	[PK] [FK] device key [PK] [FK] user key [PK] [FK] game key [PK] [FK] game activity key [PK] game date [PK] start time [PK] end time number of attempts score time spent log file id description row meta data
Notes:	
Assumptions:	

14.6 Actual Game Answer

Entity Type:	Associative Entity
Description:	The record of the answers to the games questions during game play.
Alias:	WC_F_ACTL_GAME_ANSWR
Composition:	PK] [FK] device key [PK] [FK] user key [PK] [FK] game key [PK] [FK] game activity key [PK] [FK] sort order [PK] game date [PK] game time game level question answer correct answer indicator number of hints description log file id row meta data
Notes:	
Assumptions:	

15. IMPLEMENTED DATA MODEL

15.1 Complete Data Model

See the document Database_Diagram.pdf

15.2 DDL Source

See the directory 11DatabaseCreation for the scripts to create the ORACLE database.

15.3 Data Dictionary

See the document DataDictionary.pdf

16. REFERENCE MATERIALS

16.1 Import File Formats

The data files that are imported into and exported out of the Web CRM database during the Operational Procedures are contained in comma-delimited text files. The first row contains the column header labels in comma-delimited strings. The individual file formats are displayed below.

16.2 Export File Formats

The data files that are imported into and exported out of the Web CRM database during the Operational Procedures are contained in comma-delimited text files. The first row contains the column header labels in comma-delimited strings. The individual file formats are displayed below.