**Entity Relationship Dictionary**

**Entities**

| Entity: Ally  Description: The ally ships are minions of the Megaship and are the ships that the player can manipulate for combat and resource gathering in the game; Ally ships are a type of Combatant.  Attributes:   * Autostate Cooldown, FLOAT * Combat Style, ENUM * Maximum Capacity, INT * Max Damage Buffer Amount, FLOAT * Maximum Life Amount, FLOAT * Maximum Speed, FLOAT * Mode State, ENUM * Task State, ENUM * Travel [compound attribute] * Travel Mode, ENUM * X, FLOAT * Z, FLOAT   Notes: Disjoint subclass of Combatant, primary key is the inherited Object ID from Map Object |
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| Entity: Combatant  Description: A type of Ship that can initiate combat; a Combatant has different AI depending on whether it is an Ally or a Planet Guard.  Attributes:   * Detected, BOOLEAN * Docked, BOOLEAN * Target Velocity [compound attribute] * X, FLOAT * Y, FLOAT * Z, FLOAT * Weapon Cooldown State, FLOAT   Notes: Disjoint superclass of Ally and Planet Guard; disjoint subclass of Ship, primary key is the inherited Object ID from Map Object |
| Entity: Map Object  Description: A Map Object is any object in the game with a drawable position; all Map Objects in a scene need their states to be preserved for a Saved Game in order for the application to appropriately reconstruct the map at a later point in time.  Attributes:   * Entity Type ID, ENUM * Object ID, CHAR(36) [C# Guid type], Primary Key * Position [compound attribute] * X, FLOAT * Z, FLOAT   Notes: Disjoint superclass of Planet, Ship, Star, and Weapon Emission |
| Entity: Megaship  Description: The Megaship is a type of Ship and represents the player’s primary presence on the game map.  Attributes:   * First Load Flag, BOOLEAN * Fuel Consumption Rate, FLOAT * Fuel Limit, INT   Notes: Disjoint subclass of Ship, primary key is the inherited Object ID from Map Object. |
| Entity: Newmap Template  Description: A Newmap Template is the map and metadata for a blank game; new games are initialized by cloning the keymap stored by the Newmap Template so all new games initialized by the Newmap Template are initially the same.  Attributes:   * Template Number, CHAR(36), Primary Key * Version, INT |
| Entity: Planet  Description: A Planet is a location entity that generates resources that Allies can gather; a Planet is guarded by a set of Planet Guards.  Attributes:   * First Load Flag, BOOLEAN * Life State, BOOLEAN * Name, VARCHAR(80) * Relationship State, BOOLEAN   Notes: Disjoint subclass of Map Object, primary key is the inherited Object ID from Map Object. Life State is a derived attribute calculated from the formula: FALSE if all the Planetary Resources held in the Exists On relationship have Current Resource Count <= 1 and TRUE otherwise. Relationship State is a derived attribute calculated from the formula: FALSE if all Planet Guards in the Protects relationship have a Life State of FALSE and TRUE otherwise. |
| Entity: Planet Guard  Description: A Planet Guard is a type of enemy Combatant that is assigned to guard a specific planet.  Attributes:   * Regeneration Rate, FLOAT   Notes: Disjoint subclass of Combatant, primary key is the inherited Object ID from Map Object |
| Entity: Planetary Resource  Description: The Planetary Resource is equivalent to a ‘resource mine’; the Planetary Resource represents a generator that spawns Resources.  Attributes:   * Current Resource Count, FLOAT * Maximum Resource Count, INT * Regeneration Rate, FLOAT * Type, ENUM**,** Weak Primary Key   Notes: Weak entity with owner Planet, primary key is the Object ID of the owner Planet |
| Entity: Resource  Description: A Resource represents a unit type and count of a currency in a larger inventory.  Attributes:   * Type, ENUM, Weak Primary Key * Quantity, INT   Notes: Weak entity that can be collected by Ship, primary key is the Object ID of the owner Ship |
| Entity: Saved Game  Description: A Saved Game represents the state of a game (all information needed to reconstruct the game map) and some identifying metadata to describe the Saved Game.  Attributes:   * Game Progress State, BOOLEAN * Name, VARCHAR(80) * Save ID, CHAR(36)**,** Primary Key * Timestamp, TIMESTAMP * SaveParent, CHAR(36)   Notes: Game Progress State is a derived attribute with the formula: FALSE if Megaship has Current Life Amount <= 0 or [inclusive] Megaship has no Allies in the Commands relationship with a Life State of TRUE, and is TRUE otherwise. |
| Entity: Ship  Description: A Ship is a type of Map Object that is equipped with movement and the ability to die in combat and to interact with certain types of other objects.  Attributes:   * Armor Class, FLOAT * Current Damage Buffer Amount, FLOAT * Current Life Amount, FLOAT * Current Speed, FLOAT * Life State, BOOLEAN * Name, VARCHAR(80) * Rotation [compound attribute] * X, FLOAT * Y, FLOAT * Z, FLOAT * Velocity [compound attribute] * X, FLOAT * Y, FLOAT * Z, FLOAT   Notes: Disjoint superclass of Combatant and Megaship, disjoint subclass of Map Object, primary key is the inherited Object ID from Map Object. Life State is a derived attribute calculated from the formula: FALSE if Current Life Amount <= 0 and TRUE otherwise. |
| Entity: Star  Description: A location object that can provide fuel to an entity capable of collecting solar energy.  Attributes:   * Name, VARCHAR(80)   Notes: Disjoint subclass to Map Object, primary key is the inherited Object ID from Map Object |
| Entity: User  Description: A User is a player profile for the game; a User includes personalizations like default settings and also a list of saved games the player can choose between to load.  Attributes:   * Effect Volume, FLOAT * Master Volume, FLOAT * Menu Volume, FLOAT * Music Volume, FLOAT * Salt, VARCHAR(80) * Hash, VARCHAR(80) * Username, VARCHAR(80), Primary Key |
| Entity: Weapon  Description: A Weapon is a set of variables for initializing Weapon Emission entities; it acts as a template.  Attributes:   * Collision Box, ENUM * Damage Value, FLOAT * Despawn Range, FLOAT * Power Level, FLOAT   Notes: Weak entity with owner Ally, primary key is the Object ID of the owner Ally |
| Entity: Weapon Emission  Description: A Weapon Emission is the actual ‘bullet’ fired by a given weapon; its values are instantiated by the weapon’s current state but are independent of the weapon state after initialization.  Attributes:   * Damage Value, FLOAT * Despawn Range, FLOAT * Power Level, FLOAT * Rotation [compound attribute] * X, FLOAT * Y, FLOAT * Z, FLOAT   Notes: Disjoint subclass to Map Object, primary key is the inherited Object ID from Map Object |

**Relations**

| Relationship: Ally Targets Enemy  Description: An Ally ship can target multiple Planet Guards at a time, but does not need to target any Planet Guard at all, and not all Planet Guards need to be targeted.  Attributes: Queue Number, INT  Entities: Ally, Planet Guard  Cardinality: N:M (Many-to-Many) |
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| Relationship: Collects  Description: Map Objects Collect Resources to form individual inventories.  Entities: Map Object, Resource  Cardinality: 1:N (One-to-Many) |
| Relationship: Commands  Description: The Megaship has a retinue of Ally combatants the player can control.  Entities: Megaship, Ally  Cardinality: 1:N (One-to-Many) |
| Relationship: Enemy Targets Ally  Description: A Planet Guard can target only one ship at a time, but multiple Planet Guards can target the same ship.  Entities: Ship, Planet Guard  Cardinality: 1:N (One-to-Many) |
| Relationship: Exists On  Description: A Planet has a set of Planetary Resources that together compose its resource pool.  Entities: Planet, Planetary Resource  Cardinality: 1:N (One-to-Many) |
| Relationship: Fires  Description: A Combatant fires Weapon Emissions; there is no limit to the number of Emissions a Combatant can fire but each Weapon Emission can only be spawned once.  Entities: Combatant, Weapon Emission  Cardinality: 1:N (One-to-Many) |
| Relationship: Initializes  Description: A Newmap Template is used to instantiate a new Saved Game instance; a Saved Game can only have one source for Newmap Template initialization.  Entities: Newmap Template, Saved Game  Cardinality: 1:N (One-to-Many) |
| Relationship: Lists  Description: Each Saved Game must list all the Map Object entities its state possesses in order to save and load the game.  Entities: Saved Game, Map Object  Cardinality: 1:N (One-to-Many) |
| Relationship: Manipulates  Description: A User Manipulates the state of Saved Games the user possesses.  Entities: User, Saved Game  Cardinality: 1:N (One-to-Many) |
| Relationship: Protects  Description: Planet Guards protect a Planet they are assigned to.  Entities: Planet, Planet Guard  Cardinality: 1:N (One-to-Many) |
| Relationship: Stores  Description: A Newmap Template has one copy of a Saved Game it uses as a master copy to initialize all other Saved Games that rely on the Newmap Template for initialization. A Newmap Template must have a Saved Game (total participation).  Entities: Newmap Template, Saved Game  Cardinality: 1:1 (One-to-One) |
| Relationship: Travel Target  Description: An ally ship may have one travel target, which could be a Star, another Ship, or a Planet; a Star/Ship/Planet can be targeted by multiple ally ships.  Entities: Map Object, Ally  Cardinality: 1:N (One-to-Many) |
| Relationship: Wields  Description: An Ally has a weapon it uses in combat to initialize the parameters of Weapon Emissions.  Entities: Ally, Weapon  Cardinality: 1:1 (One-to-One) |