



## -The Hearthstone Player's Card Collection-

-A Database Design Proposal-

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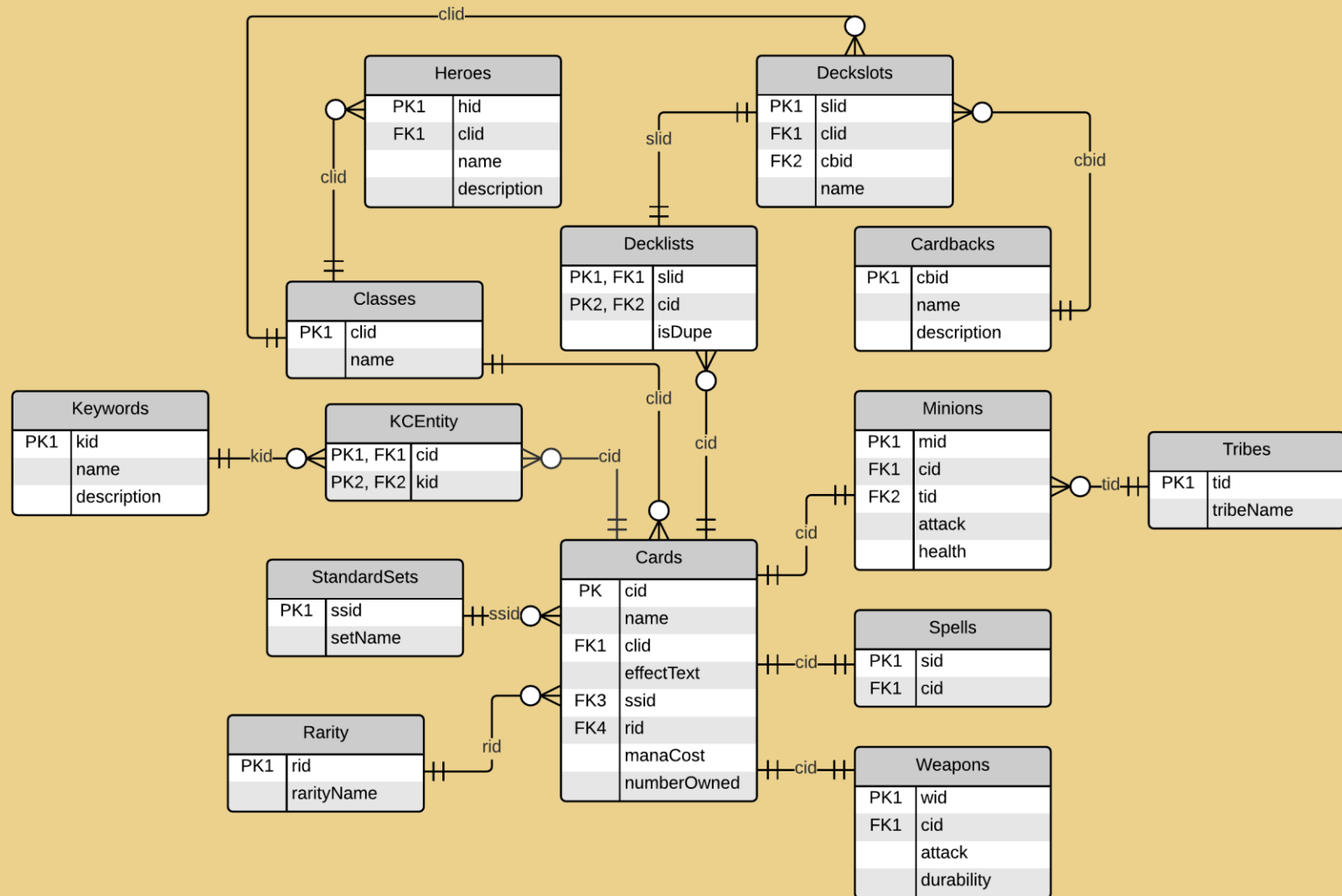
# Executive Summary

Hearthstone is a free-to-play strategy card game enjoyed by over 30 million players worldwide. Each account owner controls their collection. This collection is tied to you and you only; you cannot trade cards with anyone else. The developers have always made it clear that they want each player's collection to feel authentic, consistent, and secure.

This document represents an overview on the implementation of a Hearthstone card collection database. This database design allows for users to categorize their Hearthstone cards based on many factors such as keywords or rarity. It also allows for deck creation along with cosmetics customization like cardbacks and heroes.

Firstly, the ER Diagram will display any and all relationships between tables. Next, each table will be given a closer look containing SQL code, sample data, and functional dependencies. Following this is views, reports, stored procedures, triggers, and security protocols will be listed. Finally, implementation notes, known issues, and future enhancements will be provided.

# Entity Relationship Diagram



# Tables

**Decklists:** Stores a listing of cards (duplicate or not) and their associated decks.

```
CREATE TABLE decklists (  
  slid          CHAR(4) NOT NULL REFERENCES deckslots(slid),  
  cid          CHAR(4) NOT NULL REFERENCES cards(cid),  
  isDupe       BOOLEAN NOT NULL,  
  PRIMARY KEY (slid, cid)  
);
```

**Functional Dependencies:** slid, cid → isDupe

Sample Data on the next page.

	slid character(4)	cid character(4)	isdupe boolean
1	s100	c000	t
2	s100	c001	t
3	s100	c002	t
4	s100	c003	t
5	s100	c004	t
6	s100	c005	t
7	s100	c006	t
8	s100	c007	t
9	s100	c008	t
10	s100	c009	t
11	s100	c010	f
12	s100	c011	t
13	s100	c012	t
14	s100	c013	t
15	s100	c014	f
16	s100	c015	t
17	s101	c016	t
18	s101	c017	t
19	s101	c002	t
20	s101	c003	t
21	s101	c004	t
22	s101	c005	t
23	s101	c006	t
24	s101	c007	t
25	s101	c008	t
26	s101	c009	t
27	s101	c010	f
28	s101	c011	t
29	s101	c012	t
30	s101	c013	t
31	s101	c014	f
32	s101	c015	t

**Deckslots:** Stores a list of all deckslots and the associated class, cardback and name.

```
CREATE TABLE deckslots (  
  slid          CHAR(4) NOT NULL,  
  clid          CHAR(4) NOT NULL REFERENCES classes(clid),  
  cbid          CHAR(4) NOT NULL REFERENCES cardbacks(cbid),  
  name          VARCHAR(25) NOT NULL,  
  PRIMARY KEY (slid)  
);
```

**Functional Dependencies: slid → clid, cbid, name**

	<b>slid</b> <b>character(4)</b>	<b>clid</b> <b>character(4)</b>	<b>cbid</b> <b>character(4)</b>	<b>name</b> <b>character varying(25)</b>
<b>1</b>	s100	c101	cb00	Sample Warrior Deck
<b>2</b>	s101	c108	cb01	Sample Mage Deck

**Classes:** Stores a list of all classes and all heroes currently released for those classes.

```
CREATE TABLE classes (  
  clid          CHAR(4) NOT NULL,  
  name          VARCHAR(10) NOT NULL,  
  PRIMARY KEY (clid)  
);
```

**Functional Dependencies: clid → name**

	<b>clid</b> character(4)	<b>name</b> character varying(10)
<b>1</b>	cl00	Neutral
<b>2</b>	cl01	Warrior
<b>3</b>	cl02	Shaman
<b>4</b>	cl03	Rogue
<b>5</b>	cl04	Paladin
<b>6</b>	cl05	Hunter
<b>7</b>	cl06	Druid
<b>8</b>	cl07	Warlock
<b>9</b>	cl08	Mage
<b>10</b>	cl09	Priest



**Heroes:** Stores a list of all heroes and an image path.

```
CREATE TABLE heroes (  
  hid          CHAR(4) NOT NULL,  
  clid         CHAR(4) NOT NULL REFERENCES classes(clid),  
  name        VARCHAR(25) NOT NULL,  
  description  TEXT NOT NULL,  
  PRIMARY KEY (hid)  
);
```

**Functional Dependencies:** hid → clid, name, description

	hid character(4)	clid character(4)	name character varying(25)	description text
1	h000	cl01	Garrosh Hellscream	This former Warchief of the Horde isn't bitter about being deposed. Not at all.
2	h001	cl02	Thrall	Thrall quit his former job as Warchief to save the world and spend more time with his family.
3	h002	cl03	Valeera Sanguinar	Expert Assassin. Deadly gladiator. Best knife skills in her cooking class, according to survivors.
4	h003	cl04	Uther Lightbringer	Leader of the Knights of the Silver Hand. Best-selling author of The Light and How to Swing It.
5	h004	cl05	Rexxar	He only feels at home in the wilderness with his beasts. Super secret: Misha is his favorite.
6	h005	cl06	Malfurion Stormrage	The lord of the night elves is a wise and noble leaser. Yes, those antlers are real.
7	h006	cl07	Gul'dan	Talented, persuasive and hard-working. Too bad he wants to feed your soul to demons.
8	h007	cl08	Jaina Proudmoore	The Kirin Tor's leader is a powerful sorceress. She used to be a lot nicer before the Theramore thing.
9	h008	cl09	Anduin Wrynn	The future king of Stormwind is a kind, gentle soul. Except when he's in Shadowform.
10	h009	cl01	Magni Bronzebeard	Lord of Ironforge. King of Khaz Modan. Grand Explorer. Moira's Dad. Most Huggable Leader.
11	h010	cl08	Khadgar	His statue in Stormwind reflects his heroism, not his ego.

**Cardbacks:** Stores all cardbacks, their name, description, and an image path.

```
CREATE TABLE cardbacks (  
  cbid          CHAR(4) NOT NULL,  
  name          VARCHAR(25) NOT NULL,  
  description    TEXT NOT NULL,  
  PRIMARY KEY (cbid)  
);
```

**Functional Dependencies: cbid → name, description**

	cbid character(4)	name character varying(25)	description text
1	cb00	Classic	The only cardback you'll ever need.
2	cb01	Heroic Naxxramas	Acquired from completing the Curse of Naxxramas in Heroic mode.
3	cb02	Hallow's End	Acquired from achieving Rank 20 in Ranked Play, October 2014.
4	cb03	Magni	Acquired from purchasing the hero Magni Bronzebeard.
5	cb04	Eyes of C'thun	Acquired from pre-purchase of the Whispers of the Old Gods Card Packs.

**Cards:** Stores basic information for all cards currently in the game.

```
CREATE TABLE cards (  
  cid          CHAR(4) NOT NULL,  
  name         VARCHAR(25) NOT NULL,  
  clid         CHAR(4) NOT NULL REFERENCES classes(clid),  
  effectText   TEXT NOT NULL,  
  ssid        CHAR(4) NOT NULL REFERENCES standardSets(ssid),  
  rid         CHAR(4) NOT NULL REFERENCES rarity(rid),  
  manaCost     INT NOT NULL,  
  numberOwned  INT NOT NULL,  
  PRIMARY KEY (cid)  
);
```

**Functional Dependencies:** cid → name, clid, effectText, ssid, rid, manaCost, numberOwned

Sample Data on the next page.

	cid character	name character varying(25)	clid character	effecttext text	ssid character	rid character	manacos integer	numbers integer
1	c000	Cruel Taskmaster	cl01	Battlecry: Deal 1 damage to a minion and give it +2 Attack.	ss01	r000	2	2
2	c001	Brawl	cl01	Destroy all minions except one (chosen randomly).	ss01	r002	5	2
3	c002	Argent Squire	cl00	Divine Shield	ss01	r000	1	2
4	c003	Goldshire Footman	cl00	Taunt	ss00	r000	1	2
5	c004	Hungry Crab	cl00	Battlecry: Destroy a Murloc and gain +2/+2.	ss01	r002	1	2
6	c005	Worgen Infiltrator	cl00	Stealth	ss01	r000	1	2
7	c006	Young Dragonhawk	cl00	Windfury	ss01	r000	1	2
8	c007	Annoy-o-Tron	cl00	Taunt, Divine Shield	ss03	r000	2	2
9	c008	Bluegill Warrior	cl00	Charge	ss00	r000	2	2
10	c009	Nerubian Egg	cl00	Deathrattle: Summon a 4/4 Nerubian.	ss02	r001	2	2
11	c010	Brann Bronzebeard	cl00	Your Battlecries trigger twice	ss06	r003	3	1
12	c011	Coldlight Seer	cl00	Battlecry: Give ALL other Murlocs +2 Health	ss01	r001	3	2
13	c012	Dancing Swords	cl00	Deathrattle: Your opponent draws a card.	ss02	r000	3	2
14	c013	Injured Blademaster	cl00	Battlecry: Deal 4 damage to HIMSELF.	ss01	r001	3	2
15	c014	Gormok the Impaler	cl00	Battlecry: If you have at least 4 other minions, deal 4 damage.	ss05	r003	4	1
16	c015	Hungry Dragon	cl00	Battlecry: Summon a random 1-Cost minion for your opponent.	ss04	r000	4	2
17	c016	Ice Block	cl08	Secret: When your hero takes fatal damage, prevent it and become immune this turn.	ss01	r002	3	2
18	c017	Flamewaker	cl08	After you cast a spell, deal 2 damage randomly split among all enemies.	ss04	r001	3	2
19	c018	Totemic Might	cl02	Give your Totems +2 Health.	ss00	r000	0	2
20	c019	Vitality Totem	cl02	At the end of your turn, restore 4 Health to your hero.	ss03	r001	2	2
21	c020	Preparation	cl03	The next spell you cast this turn costs (3) less.	ss01	r002	0	2
22	c021	Cogmaster' Wrench	cl03	Has +2 Attack while you have a Mech.	ss03	r002	3	1
23	c022	Coghammer	cl04	Battlecry: Give random friendly minion Divine Shield and Taunt.	ss03	r002	3	1
24	c023	Redemption	cl04	Secret: When one of your minions dies, return it to life with 1 Health.	ss01	r000	1	2
25	c024	Gladiator's Longbow	cl05	Your hero is Immune while attacking.	ss01	r002	7	1
26	c025	Tundra Rhino	cl05	Your Beasts have Charge.	ss00	r000	5	2
27	c026	Druid of the Fang	cl06	Battlecry: If you have a Beast, transform this minion into a 7/7.	ss03	r000	5	2
28	c027	Soul of the Forest	cl06	Give all your minions Deathrattle: Summon a 2/2 Treant.	ss01	r000	4	2
29	c028	Wrathguard	cl07	Whenever this minion takes damage, also deal that amount to your hero.	ss05	r000	2	2
30	c029	Demonwrath	cl07	Deal 2 damage to all non-Demon minions.	ss04	r001	3	2
31	c030	Northshire Cleric	cl09	Whenever a minion is healed, draw a card.	ss00	r000	1	2
32	c031	Lightbomb	cl09	Deal damage to each minion equal to its Attack.	ss03	r002	6	2

**Minions:** Stores information for minion cards, such as attack, tribe, and health.

```
CREATE TABLE minions (  
  mid          CHAR(4) NOT NULL,  
  cid          CHAR(4) NOT NULL REFERENCES cards(cid),  
  tid          CHAR(4) NOT NULL REFERENCES tribes(tid),  
  attack       INT NOT NULL,  
  health       INT NOT NULL,  
  PRIMARY KEY (mid)  
);
```

**Functional Dependencies: mid → cid, tid, attack, health**

Sample Data on the next page.

	mid character(4)	cid character(4)	tid character(4)	attack integer	health integer
<b>1</b>	m000	c000	t000	2	2
<b>2</b>	m001	c002	t000	1	1
<b>3</b>	m002	c003	t000	1	2
<b>4</b>	m003	c004	t001	1	2
<b>5</b>	m004	c005	t000	2	1
<b>6</b>	m005	c006	t001	1	1
<b>7</b>	m006	c007	t002	1	2
<b>8</b>	m007	c008	t003	2	1
<b>9</b>	m008	c009	t000	0	4
<b>10</b>	m009	c010	t000	2	4
<b>11</b>	m010	c011	t003	2	3
<b>12</b>	m011	c012	t000	4	4
<b>13</b>	m012	c013	t000	4	7
<b>14</b>	m013	c014	t000	4	4
<b>15</b>	m014	c015	t004	5	6
<b>16</b>	m015	c017	t000	2	4
<b>17</b>	m016	c019	t005	0	3
<b>18</b>	m017	c025	t001	2	5
<b>19</b>	m018	c026	t000	4	4
<b>20</b>	m019	c028	t006	4	3
<b>21</b>	m020	c030	t000	1	3

**Tribes:** Stores a list of all tribes currently in the game.

```
CREATE TABLE tribes (  
  tid          CHAR(4) NOT NULL,  
  tribeName    VARCHAR(10) NOT NULL,  
  PRIMARY KEY (tid)  
);
```

**Functional Dependencies: tid → tribeName**

	<b>tid</b> <b>character(4)</b>	<b>tribename</b> <b>character varying(10)</b>
<b>1</b>	t000	None
<b>2</b>	t001	Beast
<b>3</b>	t002	Mech
<b>4</b>	t003	Murloc
<b>5</b>	t004	Dragon
<b>6</b>	t005	Totem
<b>7</b>	t006	Demon

**Spells:** Serves to differentiate spell cards from minions and weapons.

```
CREATE TABLE spells (  
  sid          CHAR(4) NOT NULL,  
  cid          CHAR(4) NOT NULL REFERENCES cards(cid),  
  PRIMARY KEY (sid)  
);
```

**Functional Dependencies: sid → cid**

	<b>sid</b> <b>character(4)</b>	<b>cid</b> <b>character(4)</b>
<b>1</b>	s000	c001
<b>2</b>	s001	c016
<b>3</b>	s002	c018
<b>4</b>	s003	c020
<b>5</b>	s004	c023
<b>6</b>	s005	c027
<b>7</b>	s006	c029
<b>8</b>	s007	c031



**Weapons:** Stores information for weapon cards, such as attack and durability.

```
CREATE TABLE weapons (  
  wid          CHAR(4) NOT NULL,  
  cid          CHAR(4) NOT NULL REFERENCES cards(cid),  
  attack       INT NOT NULL,  
  durability   INT NOT NULL,  
  PRIMARY KEY (wid)  
);
```

**Functional Dependencies:  $wid \rightarrow cid, attack, durability$**

	<b>wid</b> <b>character(4)</b>	<b>cid</b> <b>character(4)</b>	<b>attack</b> <b>integer</b>	<b>durability</b> <b>integer</b>
<b>1</b>	w000	c021	1	3
<b>2</b>	w001	c022	2	3
<b>3</b>	w002	c024	5	2

**Rarity:** Stores a list of all rarities currently in the game.

```
CREATE TABLE rarity (  
  rid          CHAR(4) NOT NULL,  
  rarityName   VARCHAR(10) NOT NULL,  
  PRIMARY KEY (rid)  
);
```

**Functional Dependencies: rid → rarityName**

	<b>rid</b> <b>character(4)</b>	<b>rarityname</b> <b>character varying(10)</b>
<b>1</b>	r000	Common
<b>2</b>	r001	Rare
<b>3</b>	r002	Epic
<b>4</b>	r003	Legendary

**StandardSets:** Stores a list of all sets that have been released for the game.

```
CREATE TABLE standardSets (  
  ssid          CHAR(4) NOT NULL,  
  setName       VARCHAR(25) NOT NULL,  
  PRIMARY KEY (ssid)  
);
```

**Functional Dependencies: ssid → setName**

	<b>ssid</b> character(4)	<b>setname</b> character varying(25)
<b>1</b>	ss00	Basic
<b>2</b>	ss01	Classic
<b>3</b>	ss02	Curse of Naxxramas
<b>4</b>	ss03	Goblins vs Gnomes
<b>5</b>	ss04	Blackrock Mountain
<b>6</b>	ss05	The Grand Tournament
<b>7</b>	ss06	The League of Explorers

**KCEntity**: Connects the Keywords table to the Cards table.

```
CREATE TABLE kcEntity (  
  cid          CHAR(4) NOT NULL REFERENCES cards(cid),  
  kid          CHAR(4) NOT NULL REFERENCES keywords(kid),  
  PRIMARY KEY (cid, kid)  
);
```

**Functional Dependencies: cid, kid →**

	cid character(4)	kid character(4)
1	c000	k000
2	c002	k001
3	c003	k002
4	c004	k000
5	c005	k003
6	c006	k004
7	c007	k011
8	c008	k005
9	c009	k012
10	c011	k000
11	c012	k006
12	c013	k000
13	c014	k000
14	c015	k013
15	c016	k008
16	c022	k014
17	c023	k008
18	c024	k009
19	c025	k005
20	c026	k000
21	c027	k012

**Keywords:** Stores a list of all special Keywords and their descriptions.

```
CREATE TABLE keywords (
  kid          CHAR(4) NOT NULL,
  name         VARCHAR(50) NOT NULL,
  description   TEXT NOT NULL,
  PRIMARY KEY (kid)
);
```

**Functional Dependencies:** kid → name, description

	kid character(4)	name character varying(50)	description text
1	k000	Battlecry	Triggers an action when the minion is played from your hand.
2	k001	Divine Shield	Absorbs the first source of damage taken by the minion, removing the shield.
3	k002	Taunt	Enemies must attack minions this minion before any non-Taunt characters. This includes minions and hero melee weapon attacks.
4	k003	Stealth	Minions with Stealth may not be the target of attacks, spells or abilities until they attack or deal damage. Once they attack or deal damage, Stealth is removed.
5	k004	Windfury	Can attack twice each turn.
6	k005	Charge	Enables the minion to attack on the same turn that it is summoned.
7	k006	Deathrattle	An ability that is triggered when the minion dies.
8	k007	Summon	Summons the specified minion/s onto the board.
9	k008	Secret	This spell's effect remains hidden until its trigger condition occurs, revealing its effect. Can only be activated during the opponent's turn.
10	k009	Immune	Immune is an ability that prevents damage dealt from any source to the target, and prevents all enemy interaction with the target.
11	k010	Transform	Changes a minion into something else irreversibly, entirely replacing the previous card.
12	k011	Taunt/Divine Shield	A combination of Taunt and Divine Shield on the same minion.
13	k012	Deathrattle/Summon	When this card dies, summon the specified minion.
14	k013	Battlecry/Summon	When this card is played, summon the specified minion.
15	k014	Battlecry/Divine Sh	When this card is played, give a minion a combination of Taunt and Divine Shield.
16	k015	Battlecry/Transform	When this card is played, change a minion into something else irreversibly

# View Definitions

**RarityInSets:** Displays the set name and rarity name for all cards.

```
CREATE VIEW RarityInSets AS
  SELECT name AS CardName, setName, rarityName
  FROM cards
  INNER JOIN standardSets
  ON cards.ssid = standardSets.ssid
  INNER JOIN rarity
  ON cards.rid = rarity.rid
  ORDER BY setName, rarityName;
```

Sample Data on the next page.

	cardname character varying(25)	setname character varying(25)	rarityname character varying(10)
1	Totemic Might	Basic	Common
2	Goldshire Footman	Basic	Common
3	Northshire Cleric	Basic	Common
4	Bluegill Warrior	Basic	Common
5	Tundra Rhino	Basic	Common
6	Hungry Dragon	Blackrock Mountain	Common
7	Flamewaker	Blackrock Mountain	Rare
8	Demonwrath	Blackrock Mountain	Rare
9	Cruel Taskmaster	Classic	Common
10	Soul of the Forest	Classic	Common
11	Worgen Infiltrator	Classic	Common
12	Argent Squire	Classic	Common
13	Young Dragonhawk	Classic	Common
14	Redemption	Classic	Common
15	Ice Block	Classic	Epic
16	Brawl	Classic	Epic
17	Hungry Crab	Classic	Epic
18	Preparation	Classic	Epic
19	Gladiator's Longbow	Classic	Epic
20	Injured Blademaster	Classic	Rare
21	Coldlight Seer	Classic	Rare
22	Dancing Swords	Curse of Naxxramas	Common
23	Nerubian Egg	Curse of Naxxramas	Rare
24	Annoy-o-Tron	Goblins vs Gnomes	Common
25	Druid of the Fang	Goblins vs Gnomes	Common
26	Coghammer	Goblins vs Gnomes	Epic
27	Cogmaster's Wrench	Goblins vs Gnomes	Epic
28	Lightbomb	Goblins vs Gnomes	Epic
29	Vitality Totem	Goblins vs Gnomes	Rare
30	Wrathguard	The Grand Tourname	Common
31	Gormok the Impaler	The Grand Tourname	Legendary
32	Brann Bronzebeard	The League of Expl	Legendary

**KeywordsInEffectText:** Displays the effect text in all keyword cards, and highlights the important and definable keywords.

CREATE VIEW KeywordsInEffectText AS

SELECT c.name AS CardName, c.effectText AS CardText, k.name AS Keywords

FROM cards c, kcEntity kc, keywords k

WHERE kc.cid = c.cid AND kc.kid = k.kid

ORDER BY k.name, c.name;

	cardname character varying(25)	cardtext text	keywords character varying(50)
1	Coldlight Seer	Battlecry: Give ALL other Murlocs +2 Health	Battlecry
2	Cruel Taskmaster	Battlecry: Deal 1 damage to a minion and give it +2 Attack.	Battlecry
3	Druid of the Fang	Battlecry: If you have a Beast, transform this minion into a 7/7.	Battlecry
4	Gormok the Impaler	Battlecry: If you have at least 4 other minions, deal 4 damage.	Battlecry
5	Hungry Crab	Battlecry: Destroy a Murloc and gain +2/+2.	Battlecry
6	Injured Blademaster	Battlecry: Deal 4 damage to HIMSELF.	Battlecry
7	Coghammer	Battlecry: Give random friendly minion Divine Shied and Taunt.	Battlecry/Divine Shield/Taunt
8	Hungry Dragon	Battlecry: Summon a random 1-Cost minion for your opponent.	Battlecry/Summon
9	Bluegill Warrior	Charge	Charge
10	Tundra Rhino	Your Beasts have Charge.	Charge
11	Dancing Swords	Deathrattle: Your opponent draws a card.	Deathrattle
12	Nerubian Egg	Deathrattle: Summon a 4/4 Nerubian.	Deathrattle/Summon
13	Soul of the Forest	Give all your minions Deathrattle: Summon a 2/2 Treant.	Deathrattle/Summon
14	Argent Squire	Divine Shield	Divine Shield
15	Gladiator's Longbow	Your hero is Immune while attacking.	Immune
16	Ice Block	Secret: When your hero takes fatal damage, prevent it and become immune this turn.	Secret
17	Redemption	Secret: When one of your minions dies, return it to life with 1 Health.	Secret
18	Worgen Infiltrator	Stealth	Stealth
19	Goldshire Footman	Taunt	Taunt
20	Annoy-o-Tron	Taunt, Divine Shield	Taunt/Divine Shield
21	Young Dragonhawk	Windfury	Windfury



# Reports & Queries

**MinionPercentage:** Displays the percent of your cards that are minions.

```
SELECT TRUNC(  
  CAST(  
    SELECT COUNT(c.cid) AS MinionCount  
    FROM cards c  
    INNER JOIN minions m  
    ON c.cid = m.cid  
  ) AS DECIMAL(5,2)  
)/(  
  SELECT COUNT(c.cid) AS AllCards  
  FROM cards c  
)*100  
) AS MinionPercentage
```

	<b>minionpercentage numeric</b>
<b>1</b>	65

## CardsMakeup: Displays what percentage of your collection each set makes up.

```
SELECT
TRUNC(CAST((
    SELECT COUNT(c.cid) AS BasicCount FROM cards c
    INNER JOIN standardSets s ON c.ssid = s.ssid
    WHERE setName = 'Basic'
    ) AS DECIMAL(5,2)
)/(SELECT COUNT(c.cid) AS AllCards FROM cards c)*100
) AS BasicPercentage,
TRUNC(CAST((
    SELECT COUNT(c.cid) AS ClassicCount FROM cards c
    INNER JOIN standardSets s ON c.ssid = s.ssid
    WHERE setName = 'Classic'
    ) AS DECIMAL(5,2)
)/(SELECT COUNT(c.cid) AS AllCards FROM cards c)*100
) AS ClassicPercentage,
TRUNC(CAST((
    SELECT COUNT(c.cid) AS GVGCount FROM cards c
    INNER JOIN standardSets s ON c.ssid = s.ssid
    WHERE setName = 'Goblins vs Gnomes'
    ) AS DECIMAL(5,2)
)/(SELECT COUNT(c.cid) AS AllCards FROM cards c)*100
) AS GVGPercentage,
```

```
TRUNC(CAST((
    SELECT COUNT(c.cid) AS BRMCount FROM cards c
    INNER JOIN standardSets s ON c.ssid = s.ssid
    WHERE setName = 'Blackrock Mountain'
    ) AS DECIMAL(5,2)
)/(SELECT COUNT(c.cid) AS AllCards FROM cards c)*100
) AS BRMPercentage,
TRUNC(CAST((
    SELECT COUNT(c.cid) AS TGTCCount FROM cards c
    INNER JOIN standardSets s ON c.ssid = s.ssid
    WHERE setName = 'The Grand Tournament'
    ) AS DECIMAL(5,2)
)/(SELECT COUNT(c.cid) AS AllCards FROM cards c)*100
) AS TGTPercentage,
TRUNC(CAST((
    SELECT COUNT(c.cid) AS LOECount FROM cards c
    INNER JOIN standardSets s ON c.ssid = s.ssid
    WHERE setName = 'The League of Explorers'
    ) AS DECIMAL(5,2)
)/(SELECT COUNT(c.cid) AS AllCards FROM cards c)*100
) AS LOEPercentage
```

	<b>basicpercentage numeric</b>	<b>classicpercentage numeric</b>	<b>vggpercentage numeric</b>	<b>brmpercentage numeric</b>	<b>tgtpercentage numeric</b>	<b>loepercentage numeric</b>
<b>1</b>	15	40	18	9	6	3

# Security

There are two types of users for this database. The developer, Blizzard Entertainment, and the player.

```
CREATE ROLE dev;  
GRANT ALL ON ALL TABLES  
IN SCHEMA PUBLIC  
TO dev;
```

```
CREATE ROLE player;  
GRANT SELECT ON ALL TABLES  
IN SCHEMA PUBLIC  
TO player;  
GRANT INSERT, UPDATE ON deckslots, decklists  
TO player;
```

# Implementation Notes/Known Problems/Future Enhancements

The implementation was fair throughout. There are obviously a lot of things to improve on, however. In Hearthstone, decks have to be restricted to 30 cards each, as well as restricted to class cards of the type that was initially selected only (as well as neutral cards). This would be fantastic to implement here. Another good implementation would be the storage of images for heroes, cardbacks, and of course, the cards themselves. Along with this would come the ability to store the artists who worked on the art for all cards. Finally, it would of course be great to actually enter all currently released cards into the database (around 800 or so as of April 2016).