

# ***Requirements specification for management and brokerage service of properties***

## ***1. General description of business process***

*a. A general description of the business process and a description of the performance metrics generated by this process, possible current analytical problems.*

The process of estate brokerage service is as follows: the customer enters the Hamilton agency and indicate willingness that she/he would like to buy or sell a property. The buyer/seller goes to the one of desks and talks with the salesman. They determine the customer's needs and expectations. The salesman show him/her the offer on a screen and ask to sign a fee contract. After signing the contract they go to the property...

2 scenarios

1) service for buyer

The worker makes photos of customer property and collect all needed information about it. In addition, the worker helps in processing of formalities.

2) service for seller

The salesman show the property to customer and describes advantages and disadvantages of it. In addition, the worker helps in negotiating a price and processing of formalities.

**Annual profit increase about 5% and the number of customers increase by 10% compared to the previous year.**

## ***b. Typical questions***

What areas are the most popular?

What types of properties are the most popular?

What sizes of apartments are most commonly sold?

Does the proximity of schools influence the buyers' decision?

Which worker make the biggest profit for the company?

How to make a property more attractive to customers?

Give the average monthly profit for the last year.

Give a total profit for the last year.

What is our ROI?

Is the ROI growing or getting smaller?

\*ROI - return on investment

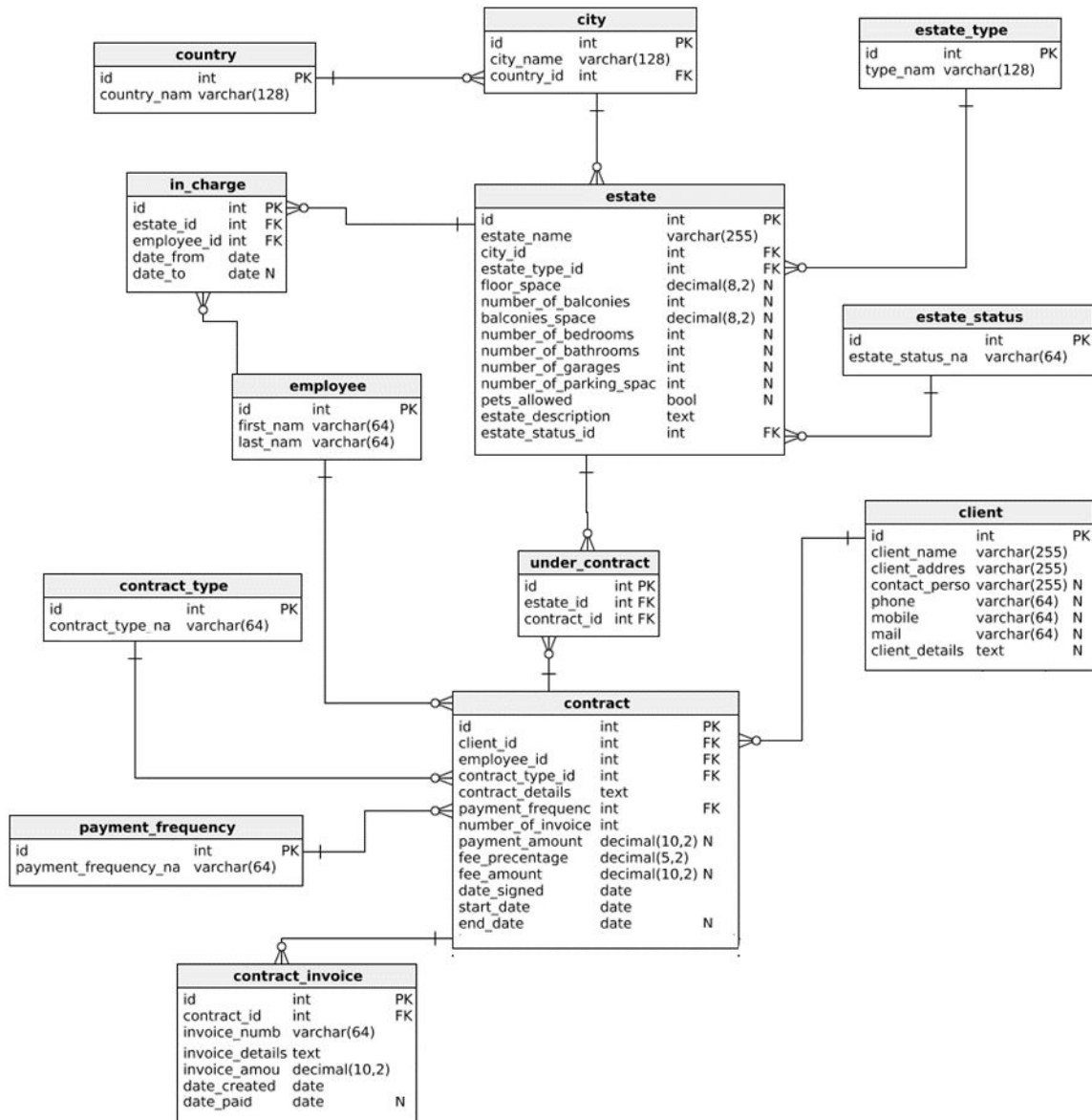
## ***c. Data***

The data about all managed properties, the clients we work with as well as any contracts related to said clients and properties are stored in a single database system. Frequent communication with clients requires that their contact information is also stored on our servers and easily accessible. We also store the information about which of our employees contacted our clients. The data about the properties contains all the details, such as their area, value, address. Such information is also frequently checked in order to answer the inquiries of potential customers.

Our employees are visible in the database only as their id numbers, names and surnames. The more detailed information, such as their date of employment, position, date of birth, education and the date of the end of employment are stored in a separate excel sheet and accessible only to the CEO.

## 2. Data sources structures

### Main Database



## Table estate

Column name	Type	Properties	Description
id	int	PK	
estate_name	varchar(255)		
city_id	int		
estate_type_id	int		
floor_space	decimal(8,2)	null	in m2
number_of_balconies	int	null	
balconies_space	decimal(8,2)	null	in m2
number_of_bedrooms	int	null	
number_of_bathrooms	int	null	
number_of_garages	int	null	
number_of_parking_spaces	int	null	
pets_allowed	bool	null	
estate_description	text		
estate_status_id	int		

## Table estate\_type

Column name	Type	Properties	Description
id	int	PK	
type_name	varchar(128)		

## Alternate keys

Key name	Columns	Description
estate_type_ak_1	type_name	

## Table city

Column name	Type	Properties	Description
id	int	PK	
city_name	varchar(128)		
country_id	int		

### Alternate keys

Key name	Columns	Description
city_ak_1	city_name, country_id	

## Table country

Column name	Type	Properties	Description
id	int	PK	
country_name	varchar(128)		

### Alternate keys

Key name	Columns	Description
country_ak_1	country_name	

## Table employee

Column name	Type	Properties	Description
id	int	PK	
first_name	varchar(64)		
last_name	varchar(64)		

## Table in\_charge

Column name	Type	Properties	Description
id	int	PK	
estate_id	int		
employee_id	int		
date_from	date		
date_to	date	null	

## Table contract

Column name	Type	Properties	Description
id	int	PK	
client_id	int		
employee_id	int		
contract_type_id	int		
contract_details	text		
payment_frequency_id	int		
number_of_invoices	int		
payment_amount	decimal(10,2)	null	rate amount
fee_precentage	decimal(5,2)		
fee_amount	decimal(10,2)	null	
date_signed	date		
start_date	date		date from which contract becomes valid

end_date	date	null	date when contract ends; in case of selling an estate end_date is the same as the start_date
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## Table contract\_type

Column name	Type	Properties	Description
id	int	PK	
contract_type_name	varchar(64)		

### Alternate keys

Key name	Columns	Description
contract_type_ak_1	contract_type_name	

## Table client

Column name	Type	Properties	Description
id	int	PK	
client_name	varchar(255)		
client_address	varchar(255)		
contact_person	varchar(255)	null	
phone	varchar(64)	null	
mobile	varchar(64)	null	
mail	varchar(64)	null	
client_details	text	null	

## Table payment\_frequency

Column name	Type	Properties	Description
id	int	PK	
payment_frequency_name	varchar(64)		

### Alternate keys

Key name	Columns	Description
payment_frequency_ak_1	payment_frequency_name	

## Table contract\_invoice

Column name	Type	Properties	Description
id	int	PK	
contract_id	int		
invoice_number	varchar(64)		
invoice_details	text		list of invoice items
invoice_amount	decimal(10,2)		
date_created	date		
date_paid	date	null	

### Alternate keys

Key name	Columns	Description
contract_invoice_ak_1	invoice_number	

## Table under\_contract

Column name	Type	Properties	Description
id	int	PK	
estate_id	int		
contract_id	int		



#### Alternate keys

Key name	Columns	Description
under_contract_ak_1	estate_id, contract_id	

### Table estate\_status

Column name	Type	Properties	Description
id	int	PK	
estate_status_name	varchar(64)		

#### Alternate keys

Key name	Columns	Description
estate_status_ak_1	estate_status_name	

### Employee Excel Sheet

Information about employees hired in the Hamilton estate agency, each line describes one employee, row 1 is a header row.

Column A - Identification number of the bookstore in which the employee is employed (numeric, 0 decimal precision),

Column B - Employees' PIN (PIN number),

Column C - Employee's name (text),

Column D - Employee's surname (text), in case of surname change the column is updated,

Column E - Date of birth (in format year - month – day e.g. 2013-12-09),

Column F - Education (text), in case of change the column is updated,

Column G - Position (text), each row means employment of a given person on a given position; in case of position change the date of end of work on the current position is written and there is a new line with a new position and a new date of employment; there are two available positions: salesman and director, each bookstore has exactly one director,

Column H - Date of acceptance for the position (Date in format year - month - day, e.g. 2013-12-09),

Column I - Date of end of work on the current position (Date in format year - month - day, e.g. 2013-12-09), it is not set if the employee currently works on a given position.

### 3. Scenarios of analytical problems

What affected the change in the number of customers, when compared to the previous month?

1. Check from which urban areas the clients come from.
2. Compare the number of customers in different seasons.
3. Compare the number of customers at different days of a week.
4. Which type of offer was the most popular among customers?
5. Check which of our employees were in charge of the most successful transactions.
6. Compare the number of customers in relation to economic situation on the market.
7. Check the level of satisfaction of our customers with our services.

What affected the change in the profit, when compared to the previous month?

1. Check the most common type of transactions made in the previous month.
2. Calculate the average fee amount for contracts made in the previous month.
3. Check which estate type is the most profitable.
4. Compare the profits gained from customers who are looking to sell their properties and those who are having difficulty purchasing one.
5. Compare the day's profit at different days of a week.

### 4. Data needed for analytical problems

What affected the change in the number of customers, when compared to the previous month?

1. Check from which urban areas the clients come from.
  - a. **client:** *client\_address*
2. Compare the number of customers in different seasons.
  - a. **contract:** *date\_signed*  
every contract is tied to a customer therefore, the frequency of contracts is equal the frequency of customers.
3. Compare the number of customers at different days of a week.
  - a. **contract:** *date\_signed*
4. Which type of offer was the most popular among customers?
  - a. **estate\_type:** *id, type\_name*;  
**estate:** *estate\_name, estate\_type\_id*;  
**under\_contract:** *estate\_id, contract\_id*;  
**contract:** *id, contract\_type\_id*;  
**contract\_type:** *id, contract\_type\_name*
5. Check which of our employees were in charge of the most successful transactions.

- a. **contract:** *fee\_percentage, fee\_amount, payment\_amount*  
measure of success
  - b. **contract:** *employee\_id*  
**employee:** *id, first\_nam, last\_nam*  
find the responsible employees
  - c. **Employee Excel Sheet:** *Col F - Education, Col E - Date of birth, Col H - Date of acceptance for the position, Col I - Date of end of work on the current position*  
data for further considerations
  
6. Compare the number of customers in relation to economic situation on the market.
  - a. **contract:** *date\_signed, id;*  
**under\_contract:** *contract\_id, estate\_id;*  
**estate:** *id*  
find the frequency of successful contracts or contracts from specific time frame and related properties
  - b. **estate:** *floor\_space, number\_of\_balconies, number\_of\_bedrooms, pets\_allowed, estate\_type\_id;*  
**estate\_type:** *id, type\_nam*  
check types of properties sold
  - c. **Data from external sources or not explicitly stored in the database:** the company's market share and penetration, competitor's performance, real estate services that are in demand, listing and sales data, features of listed and recently sold properties, economic, social, political, and environmental data
  
7. Check the level of satisfaction of our customers with our services.
  - a. **level of satisfaction** - no data
  - b. **opinion about our service** - no data

It is not possible to build a BI system to support Hamilton estate agency in solving these analytical problems without introducing additional activities. We suggest to introduce an online survey, which is sent to the clients after their visit in the agency and is completely anonymous. Such questionnaire should contain at minimum the following two questions:

- Are you satisfied with our service?
- Will you recommend our agency to your friends? Why?

Survey results are automatically uploaded to the survey system and entered into the excel sheet. We assume that 10% of our clients fill in the questionnaire.

Sample structure of the survey sheet:

Column A – ID number (randomly generated)

Column B – Response for “Are you satisfied with our service?” (Yes/No)

Column C – Response for “Will you recommend our agency to your friends?” (Yes/No)

Column D – Response for “Why?” (text description)

What affected the change in the profit, when compared to the previous month?

1. Check the most common type of contract made in the previous month.
  - a. **contract:** *date\_signed, contract\_type;*
2. Calculate the average fee amount for contracts made in the previous month.
  - a. **contract:** *date\_signed, fee\_amount*
3. Check which estate type is the most profitable.
  - a. **estate\_type:** *id, type\_nam;*  
**estate:** *estate\_type\_id, id;*  
**under\_contract:** *estate\_id, contract\_id;*  
**contract:** *id*  
link estate type to contract
  - b. **contract:** *payment\_amount, fee\_percentage, fee\_amount*
4. Compare the profits gained from customers who are looking to sell their properties and those who are having difficulty in purchasing one.
  - a. **contract\_type:** *id, contract\_type\_name*  
**contract:** *id, client\_id, contract\_type\_id, payment\_amount, fee\_precentage, fee\_amount, signed\_date*
5. Compare the day's profit at different days of a week.
  - a. **contract:** *fee\_amount, signed\_date*