Business process

The Data warehouse is designed for marketing business processes. This process is described in the document Specification of business processes in Real estate network

Relational Database schema

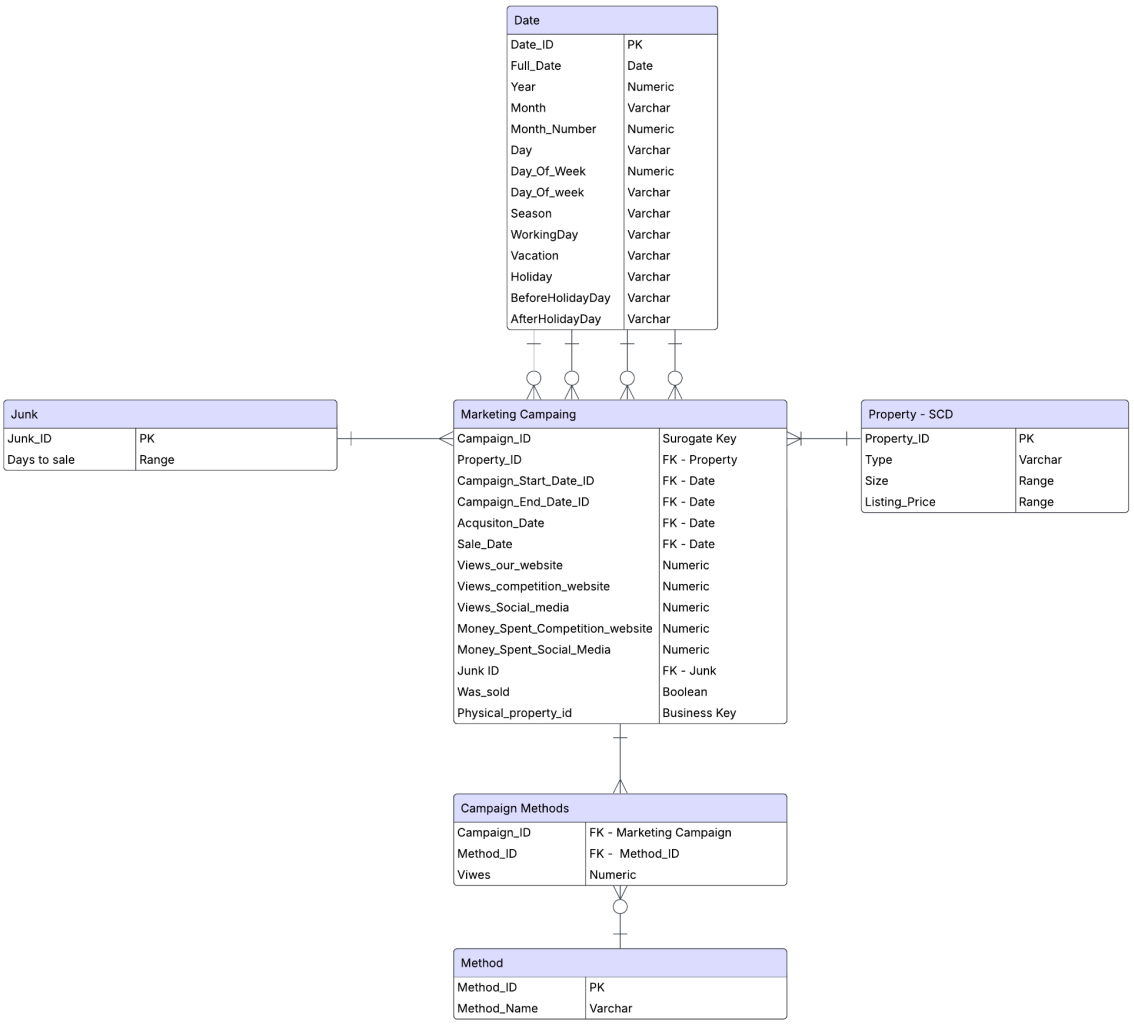

TABLE NAME	ATTRIBUTE	ATTRIBUTE TYPE	DESCRIPTION
MARKETING_CAMPAIGN (FACT TABLE)	One tuple describes one fact of a property marketing campaign.		
	Campaign_ID	Surrogate Key	Unique identifier for the marketing campaign (generated by the system).
	Property_ID	FK – Property	Property associated with the campaign.
	Campaign_Start_Date_ID	FK – Date	Start date of the campaign.
	Campaign_End_Date_ID	FK – Date	End date of the campaign.
	Acqusiton_Date	FK – Date	Date when the property was acquired (used for timeline tracking).
	Sale_Date	FK – Date	Date when the property was sold (used for timeline tracking).
	Money_Spent_Competition_ Website	Numeric	Budget spent analyzing or advertising on competitor sites.
	Money_Spent_Social_Media	Numeric	Budget spent on social media platforms (ads, posts, etc.).
	Views_Our_Website	Numeric	Views received from the company's own website.
	Views_Competition_Website	Numeric	Views received at the competitor website
	Views Social_Media	Numeric	Views gained via social media platforms.
	Junk ID	FK - Junk	FK Junk Junk attributes
	Was sold	boolean	Accepted values: 0 or 1
CAMPAIGN METHODS (FACT TABLE)	One tuple describes the usage of a specific marketing method in a campaign.		
	Campaign_ID	FK – Marketing Campaign	Reference to the related campaign.
	Method ID	FK – Method	Reference to the marketing method used in the campaign.
	Views	Numeric	Views for given method
METHOD (DIMENSION TABLE)	One tuple describes one method of marketing used in campaigns.		
	Method ID	Primary Key	Unique identifier of the method.

	MethodName	Varchar(50)	Name of the method. Allowed values: Allowed values: "Video", "Photos", "Social Media", "Email Marketing", "SEO", "Content Marketing", "Influencer Marketing", "Paid Ads", "SMS Marketing"
DATE (DIMENSION TABLE)	One tuple describes one calendar day.		
	Date_ID	Primary Key	Unique ID of the date.
	Full_Date	Date	Full date
	Year	4 digits	Year
	Month	Varchar(10)	Month. Allowed values: January, February, March, April, May, June, July, August, September, October, November and December
	Month_Number	Numeric	Numeric representation of the month
	Day	Numeric	Day number.
	Day_Of_Week	Varchar(10)	Day of week. Allowed values: Monday, Tuesday, Wednesday, Thursday, Friday, Saturday and Sunday
	Day_Of_Week_n	Numeric	Day of week.
	Season	Varchar(10)	Seasons: Spring, Summer, Autumn, Winter
	WorkingDay	Varchar(15)	Working day. Allowed values: day off and working day
	Vacation	Varchar(20)	Vacation time characteristics. Allowed values: non-holiday, winter holiday and summer holiday
	Holiday	Varchar(50)	Type of holiday. Allowed values: Christmas, Grandmother's day, Grandfather's day, Easter Monday, Labour Day, Constitution Day, Independence Day, Corpus Christi, The Epiphany, no holiday
	BeforeHolidayDay	Varchar(62)	Before holiday day. Allowed values: tomorrow is Grandmother's day, tomorrow is Grandfather's day, tomorrow is Easter Monday, tomorrow is

			Labour Day, tomorrow is Constitution Day, tomorrow is Independence Day, tomorrow is Corpus Christi, tomorrow is The Epiphany, no holiday
	AfterHolidayDay	Varchar(62)	Type of holiday. Allowed values: yesterday is Christmas, yesterday is Grandmother's day, yesterday is Grandfather's day, yesterday is Easter Monday, before is Labour Day, yesterday is Constitution Day, yesterday is Independence Day, yesterday is Corpus Christi, yesterday is The Epiphany, no holiday
PROPERTY (DIMENSION TABLE)	One tuple describes property with its attributes.		
	Property_ID	Primary Key	Unique property identifier.
	Type	Varchar(25)	Type of the property : House, apartment, studio, Villa, penthouse
	Size	Varchar(30)	Size of the property in square meters .Allowed values: <50 and less) square meters, <50 - 80) square meters, <80 - 120) square meters, <120 - 180) square meters, <180 - 300) square meters, <300 and more) square meters,
	Listing_Price	Varchar(30)	Listing price of the property in square meters .Allowed values: <100 000 and less) PLN, <100 000 - 400 000) PLN, <400 000 - 700 000) PLN, <700 000 - 1 000 000) PLN, <1 000 000 and more) PLN,
JUNK (DIMENSION TABLE)	The tuples correspond to "all" possible combinations of values for Day_ to_sale.		
	Junk_ID	Numeric	PK
	Days_to_sale	Varchar(20)	Allowed values: Less then 6 months, 6 months or more,

			Not sold.

Dimensional model

Fact definitions

Fact 1 Marketing campaign: Marketing Campaign performed on given starting and ending dates, for a given property type which has been bought and sold at given dates and the campaign has also unique days_to_sale

Fact table: Marketing Campaign

Granularity:

- a specific starting date
- a specific ending date
- a specific acquisition date
- a specific sale date
- a specific property type
- a specific days to sale

Measures and aggregation functions:

Total sales

SUM(MarketingCampagin.Was_sold)

Total number of campaigns
DISTINCT COUNT (MarketingCampaign.Campaign_ID)

Total Views:
Total Views on our website +
Total Views on competition website +
Total Views on social media

Total Views on our website:
SUM (MarketingCampaign.Views_our_website)

Total Views on competition website:
SUM (MarketingCampaign.Views_competition_website)

Total Views on social media:
SUM (MarketingCampaign.Views_Social_Media)

Money Spent :
Total Cost on competition website +
Total Cost on social media

Total Cost on competition website:
SUM (MarketingCampaign.Money_Spent_competition_website)

Total Cost on social media:
SUM (MarketingCampaign.Money_spent_Social_Media)

Cost ratio our website: 0
cost ratio competition website:
Total cost on competition website / Total cost on competition website
Cost ratio Social media
Total Cost on social media / Total Cost on social media

Fact 2 Campaign methods : Campaign method used for concerning specific Marketing campaign with the specific method used

Fact table: Campaign methods

Granularity:
- a specific marketing campaign
- a specific method

Measures and aggregation functions:

Total Views for given method:
SUM (Views)

Dimension definitions

Fact 1 Marketing Campaign

DIMENSION / DIMENSION ATTRIBUTE	TABLE / COLUMN	TYPE
Sale Date Hierarchy	• Date.Year •• Date.Season ••• Date.Month •••• Date.Date	Hierarchical dimension
Sale Holiday date Hierarchy	• Date.Year •• Date.Season ••• Date.Vacation	Hierarchical dimension
Sale Working date Hierarchy	• Date.Year •• Date.Season ••• Date.Month •••• Date.WorkingDay	Hierarchical dimension
Sale Day of the week Hierarchy	•• Date.Year ••• Date.Season ••• Date.Month •••• Date.DayOfWeek	Hierarchical dimension

Sale Season Hierarchy	• Date.Year •• Date.Season	Hierarchical dimension
Sale Date	Date	Dimension
Sale Year	Date.Year	Dimension attribute
Sale Month	Date.Month	Dimension attribute
Sale Day	Date.Day	Dimension attribute
Sale Season	Date.Season	Dimension attribute
Sale Before Holiday	Date.BeforeHoliday	Dimension attribute
Sale After Holiday	Date.AfterHoliday	Dimension attribute
Acquisition Date Hierarchy	• Date.Year •• Date.Season ••• Date.Month •••• Date.Date	Hierarchical dimension
Acquisition Holiday date Hierarchy	• Date.Year •• Date.Season ••• Date.Vacation	Hierarchical dimension
Acquisition Working date Hierarchy	• Date.Year •• Date.Season ••• Date.Month •••• Date.WorkingDay	Hierarchical dimension
Acquisition Day of the week Hierarchy	•• Date.Year ••• Date.Season ••• Date.Month •••• Date.DayOfWeek	Hierarchical dimension
Acquisition Season Hierarchy	• Date.Year •• Date.Season	Hierarchical dimension
Acquisition Date	Date	Dimension
Acquisition Year	Date.Year	Dimension attribute
Acquisition Month	Date.Month	Dimension attribute
Acquisition Day	Date.Day	Dimension attribute
Acquisition Season	Date.Season	Dimension attribute
Acquisition Before Holiday	Date.BeforeHoliday	Dimension attribute
Acquisition After Holiday	Date.AfterHoliday	Dimension attribute
Campaign Start Date Hierarchy	• Date.Year •• Date.Season ••• Date.Month •••• Date.Date	Hierarchical dimension

Campaign Start Holiday date Hierarchy	• Date.Year •• Date.Season ••• Date.Vacation	Hierarchical dimension
Campaign Start Working date Hierarchy	• Date.Year •• Date.Season ••• Date.Month •••• Date.WorkingDay	Hierarchical dimension
Campaign Start Day of the week Hierarchy	•• Date.Year ••• Date.Season ••• Date.Month •••• Date.DayOfWeek	Hierarchical dimension
Campaign Start Season Hierarchy	• Date.Year •• Date.Season	Hierarchical dimension
Campaign Start Date	Date	Dimension
Campaign Start Year	Date.Year	Dimension attribute
Campaign Start Month	Date.Month	Dimension attribute
Campaign Start Day	Date.Day	Dimension attribute
Campaign start Season	Date.Season	Dimension attribute
Campaign start Before Holiday	Date.BeforeHoliday	Dimension attribute
Campaign start After Holiday	Date.AfterHoliday	Dimension attribute
Campaign end Date Hierarchy	• Date.Year •• Date.Season ••• Date.Month •••• Date.Date	Hierarchical dimension
Campaign end Holiday date Hierarchy	• Date.Year •• Date.Season ••• Date.Vacation	Hierarchical dimension
Campaign end Working date Hierarchy	• Date.Year •• Date.Season ••• Date.Month •••• Date.WorkingDay	Hierarchical dimension
Campaign end Day of the week Hierarchy	•• Date.Year ••• Date.Season ••• Date.Month •••• Date.DayOfWeek	Hierarchical dimension
Campaign end Season Hierarchy	• Date.Year •• Date.Season	Hierarchical dimension
Campaign end Date	Date	Dimension
Campaign end Year	Date.Year	Dimension attribute

Campaign end Month	Date.Month	Dimension attribute
Campaign end Day	Date.Day	Dimension attribute
Campaign end Season	Date.Season	Dimension attribute
Campaign end Before Holiday	Date.BeforeHoliday	Dimension attribute
Campaign end After Holiday	Date.AfterHoliday	Dimension attribute
Physical property id	Marketing_Campaign.Physical_property_id	degenerated dimension
Property	Property	Dimension
Property type	Property.type	Dimension attribute
Property size	Property.size	Dimension attribute
Property listing price	Property.listing_price	Dimension attribute
Property characteristic hierarchy	• Property.type •• Property.size	
Junk	Junk	Dimension
Days to sale	Junk.Days_to_sale	Dimension attribute

Fact 2 Campaign method

DIMENSION / DIMENSION ATTRIBUTE	TABLE / COLUMN	TYPE
METHOD	Method	Dimension
Method name	Method.Method_Name	Dimension attribute
Marketing Campaign	Marketing Campaign	Dimension
Physical property id	Marketing_Campaign.Physical_property_id	dimension attribute
Property	Property	Dimension

Property type	Property.type	Dimension attribute
Property size	Property.size	Dimension attribute
Property listing price	Property.listing_price	Dimension attribute
Property characteristic hierarchy	• Property.type •• Property.size	
Junk	Junk	Dimension
Days to sale	Junk.Days_to_sale	Dimension attribute
Campaign end Date Hierarchy	• Date.Year •• Date.Season ••• Date.Month •••• Date.Date	Hierarchical dimension
Campaign end Holiday date Hierarchy	• Date.Year •• Date.Season ••• Date.Vacation	Hierarchical dimension
Campaign end Working date Hierarchy	• Date.Year •• Date.Season ••• Date.Month •••• Date.WorkingDay	Hierarchical dimension
Campaign end Day of the week Hierarchy	•• Date.Year ••• Date.Season ••• Date.Month •••• Date.DayOfWeek	Hierarchical dimension
Campaign end Season Hierarchy	• Date.Year •• Date.Season	Hierarchical dimension
Campaign end Date	Date	Dimension
Campaign end Year	Date.Year	Dimension attribute
Campaign end Month	Date.Month	Dimension attribute
Campaign end Day	Date.Day	Dimension attribute
Campaign end Season	Date.Season	Dimension attribute
Sale Date Hierarchy	• Date.Year •• Date.Season ••• Date.Month •••• Date.Date	Hierarchical dimension
Sale Holiday date Hierarchy	• Date.Year •• Date.Season ••• Date.Vacation	Hierarchical dimension

Sale Working date Hierarchy	• Date.Year •• Date.Season ••• Date.Month •••• Date.WorkingDay	Hierarchical dimension
Sale Day of the week Hierarchy	•• Date.Year ••• Date.Season ••• Date.Month •••• Date.DayOfWeek	Hierarchical dimension
Sale Season Hierarchy	• Date.Year •• Date.Season	Hierarchical dimension
Sale Date	Date	Dimension
Sale Year	Date.Year	Dimension attribute
Sale Month	Date.Month	Dimension attribute
Sale Day	Date.Day	Dimension attribute
Sale Season	Date.Season	Dimension attribute
Acquisition Date Hierarchy	• Date.Year •• Date.Season ••• Date.Month •••• Date.Date	Hierarchical dimension
Acquisition Holiday date Hierarchy	• Date.Year •• Date.Season ••• Date.Vacation	Hierarchical dimension
Acquisition Working date Hierarchy	• Date.Year •• Date.Season ••• Date.Month •••• Date.WorkingDay	Hierarchical dimension
Campaign Start Date	Date	Dimension
Campaign Start Year	Date.Year	Dimension attribute
Campaign Start Month	Date.Month	Dimension attribute
Campaign Start Day	Date.Day	Dimension attribute
Campaign start Season	Date.Season	Dimension attribute

Checking the feasibility of queries based on the multidimensional model

1. What are the top-performing ad campaigns in terms of dollars spent to views generated in the last 12 months?
    - Measure: Cost ratio our website

Cost ratio competition website
Cost ratio Social media

- Dimension: Campaign end date (dimension attribute: Campaign end month)
- Dimension: Campaign end date (dimension attribute: Campaign end year)
- Degenerated Dimension: Physical_property_id

2. Did any apartment remain unsold for more than 6 months?
   - Measure: Total sales
   - Dimension: Junk (Dimension attribute: Days_to_sale)

3. Compare the average number of views on our website to the competition website all time?
   - Measure: Total Views on our website
     Total Views on competition website
     Total number of campaigns
     Total number of campaigns

4. Give 3 types of best-selling apartments in the last year?
   - Measure: Total sales
   - Dimension: Sale Date(Dimension attribute: Sale year)
   - Dimension: Property(Dimension attribute: Property Type)

5. What is the average marketing cost per successful sale in the last year?
   - Measure: Money Spent
     Total sales
   - Dimension: Sale Date(Dimension attribute: Sale year)

6. Do property sales change before and after major holidays in the last year?
   - Measure: Total sales
   - Dimension: Sale Date (dimension attribute: sale year)
   - Dimension: Sale Date (dimension attribute: sale after holidays)
   - Dimension: Sale Date (dimension attribute: sale before holidays)

7. Compare the difference in views for properties marketed with videos compared those with only images in the last year.
   - Measure: Total Views for given method
   - Dimension: Method (Dimension attribute: Method_Name)
   - Dimension: Sale date(Dimension attribute: Sale year)

8. During which months do we get the highest/lowest views from marketing campaigns in the last year?
   - Measure: Total Views
   - Dimension: Campaign start date(dimension attribute,campaign stat month)
   - Dimension: Campaign start date(dimension attribute,campaign stat year)

9. What are the top 5 months with the highest number of property sales all time?
    - Measure: Total sales
    - Dimension: Sale Date(dimension attribute: Sale month)

10. What is the percentage increase in the number of sales during each summer season compared to other seasons all time?
    - Measure: Total sales
    - Dimension: Sale date(dimension attribute: Sale season)

Checking if there are Date in the Date sources needed to fill the Date warehouse

TABLE NAME	COLUMN	SOURCE
MARKETING_CAMPAIGN	One tuple describes one fact of a property marketing campaign.	
	Campaign_ID	Campaign ID. Unique identifier for the marketing campaign (generated by the system). Based on marketing excel Column A. It matches property id in the excel.
	Property_ID	Property ID. Property type associated with the campaign. Foreign key to Property dimension. Based on marketing excel Column A and its description in the database.
	Campaign_Start_Date_ID	Start date of the campaign. Foreign key from Date dimension table. Based on Campaign_Start_Date_ID. Based on marketing excel Column H.
	Campaign_End_Date_ID	End date of the campaign. Foreign key from Date dimension table. Based on Campaign_End_Date_ID. Based on marketing excel Column I.

	Acqusiton_Date	Date when the property was acquired. Used for timeline used for tracking and analysis.It is based on Database, from Sale Entity column sale/date.
	Sale_Date	Date when the property was sold. Sourced from timeline data for performance tracking.It is based on Database, from Sale Entity column sale/date.
	Money_Spent_Competition_Website	Budget spent for advertisements or analysis on competitor websites. Value taken from digital marketing logs. Based on marketing excel Column E.
	Money_Spent_Social_Media	Budget spent on social media platforms (ads, posts, promotions). Based on social media reports. Based on marketing excel Column G.
	Views_Our_Website	Number of views received from the company's official website. Based on analytics tools. Based on marketing excel Column C.
	Views_Competition_Website	Number of views measured from competitor websites. Based on external competitive analysis sources. Based on marketing excel Column D.
	Views Social_Media	Number of views generated through social media. Value sourced from social media platforms. Based on marketing excel Column F.
	Was_sold	Number 0 or 1.Representing if the property mentioned in the campaign was sold. We get property id from marketing excel then match it with the propertin in the database then we are checking if there is a connection between the given property and the sale
	Junk ID	Junk ID. Foreign key from dimension table. Based on pre-generated combinations of attributes such as Days to sale.

	Physical_property_ID	Business key. It comes from the marketing excel column A, where we associate one marketing campaign with one property
CAMPAIGN METHODS	One tuple describes the usage of a specific marketing method in a campaign.	
	Campaign_ID	Campaign ID. Foreign key from dimension table. Refers to the Campaign_ID in the Marketing_Campaign fact table. Based on marketing excel Column A.
	Method ID	Method ID. Foreign key from dimension table. Refers to the Method_ID in the METHOD table representing the marketing technique used. Based on marketing excel Column J.
METHOD	One tuple describes one method of marketing used in campaigns.	
	Method ID	Method ID. Unique identifier for each marketing method. Surrogate key generated by the database. Based on marketing excel Column J.
	MethodName	Name of the marketing method. Taken from internal marketing documentation or campaign strategy definitions. Based on marketing excel Column J. Allowed values: "Video", "Photos", "Social Media", "Email Marketing", "SEO", "Content Marketing", "Influencer Marketing", "Paid Ads", "SMS Marketing"
	Views	Number of views generated through given method. Summed from the marketing excel columns C, D ,F
DATE	One tuple describes one calendar day. All the data in this table are generated tuple by tuple based on any calendar,	

	before ETL process.	
PROPERTY	One tuple describes property with its attributes.	
	Property_ID	Property ID. Unique property identifier. Surrogate key generated by the databasse.
	Type	Type of the property (House, apartment, studio, Villa, penthouse). Value taken from the source property database from entity property and attribute type.
	Size	Size of the property in square meters .Allowed values: <50 and less) square meters, <50 - 80) square meters, <80 - 120) square meters, <120 - 180) square meters, <180 - 300) square meters, <300 and more) square meters, It is classified based on Database, from Property Entity column size
	Listing_Price	Listing price of the property in square meters .Allowed values: <100 000 and less) PLN, <100 000 - 400 000) PLN, <400 000 - 700 000) PLN, <700 000 - 1 000 000) PLN, <1 000 000 and more) PLN,

		It is classified based on Database, from Property Entity column price
JUNK	The tuples correspond to "all" possible combinations of values for Day_ to_sale.	
	Junk_ID	Surrogate key generated by the system. Represents unique combinations of miscellaneous attributes.
	Days_to_sale	Number of days between property acquisition and sale. Calculated based on Acquisition_Date and Sale_Date in the Marketing_Campaign table. Categorized into allowed ranges. Allowed values: Less then 6 months, 6 months or more, Not sold.