FINANCIAL DATA MART

BI System Specifications Document

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Content

1.General

Experis Israel is a company that specializes in the placement of professional personnel, outsourcing, and training in the fields of technology and engineering.

The main objective is to create an end-to-end BI solution for the HR and Finance Departments to empower executives and key stakeholders with data analytics to drive data decision-making and improve financial efficiency.

The Data Mart creation will be done using data derived from the billing operational system database (ExperisBillings), and it will include summarized data tables, focusing on the Company's customers, employees, departments (Cyber , BI , Sales , etc.), and financial data.

2. Content

The Financial Data Mart will include transactional and informative focused data regarding Company employees, customers, departments, salaries, and invoices. The data in the data mart will be according to the S.M.A.R.T method to accomplish management goals.

ERD model of the FinancialDM Data Mart: ERD Link

2.1 Tabels

The Financial Data Mart will include 2 Fact tables, 5 Dimension tables, and 2 History tables:

DIM_Customers - Information about the company's customers.
DIM_Employees - Information about the company's employees.
DIM_Departments Information about the company's departments.
DIM_Roles - Information about the company's roles and payment/billing methods.
DIM_ Absence - Information about the company's absence's types.
FACT_ ReportedHours- Information about the working hours of the company's employees.
FACT_Invoices - Information about the working hours of the company's employees at the customers and the total salary that the customer has to pay.

History Management Tables:

DIM_CustomersHistory - Information about the historical record of changes to customer information. The customer history table will be included to track changes in customers over time using Slowly Changing Dimensions (SCD) Type 4.
DIM_EmployeesHistory - Information about the historical record of changes to employee information. The employee history table will be included to track changes in employees over time using Slowly Changing Dimensions (SCD) Type 4.

The tables will be updated daily at 05:00:00 using an automated process configured in the SQL Server Management Studio.

2.2 Required Analyses

The data mart will supply the data that enables to create the following analysis within a certain period (month, year, etc.):

•Number of active employees divided into departments, customers, positions, seniority, employee salary, customer billing
•Average seniority of employees broken down into departments, customers, role, employee salary, customer billing
•Number of employees divided by monthly billing and hourly billing customers , monthly salary and hourly salary.
•Average monthly billing rate broken down into departments, customers, role, employee salary, customer billing.
•Average age of employees broken down into departments, customers, role, employee salary, customer billing
•Average monthly billing rate broken down into departments, customers, role, employee salary, customer billing.
•Average hourly billing rate broken down into departments, customers, role, employee salary, customer billing.
•How many working hours were reported in a certain period.
•How many vacation days were reported in a certain period.
•How many employees have reported attendance and how many have not yet reported – in which how many have been approved / yet to be approved.
•How many invoices have already been issued.

In addition to the summarized reports, the data mart will be able to create the following customers reports for each employee:

•List of employees placed at a client, with an analysis of seniority, role, client billing, employee salary, division affiliation.

•List of employees with reference to the last date of salary update and the update of the customer billing rate, with an analysis of seniority, position, customer billing, employee salary, division affiliation.

2.3 visualizations

The project will contain a dashboard and reports in Power BI that will contribute to the achievement of the project's goals:

Executive Dashboard:
The dashboard will include key visuals from the reports. The dashboard will allow a wider perspective on the data and will integrate measures from customers and customers' invoices, employees, and employees' payroll analysis.

Customers Details And Billing Rate Analysis:
The customer analysis report will include data regarding Experis's customers and customer invoices by Year, Month, employee, customer, department, role, employee seniority, payment type, and billing type.
This report is aimed to help Experis's HR and Finance departments to understand better their customers' behavior, like Which customer is the most profitable etc.

Employee Payroll Analysis:
The employee payroll analysis report will include data regarding Experis's employee payrolls by Year, Month, employee, customer, department, role, employee seniority, payment type, and billing type.
This report is aimed to help Experis's Finance department to understand better the employee payrolls, such as the number of approved and unapproved absences, number of employees who reported/did not report attendance, average salary by seniority, etc.

Employees Analysis:
The employee analysis report will include data regarding Experis's employees by Year, Month, employee, customer, department, role, employee seniority, payment type, and billing type.
This report is aimed to help Experis's HR and Finance departments to know better their employee's details, such as the number of employees by role/department, salary, gender, average age, average seniority, number of sick/vacation days, etc.

Customers Analysis:
The customer analysis report will include data regarding Experis's customers and employees by Year, Month, employee, customer, department, role, employee seniority, payment type, and billing type.
This report is aimed to help Experis's HR and Finance departments to understand better their customers and employees.

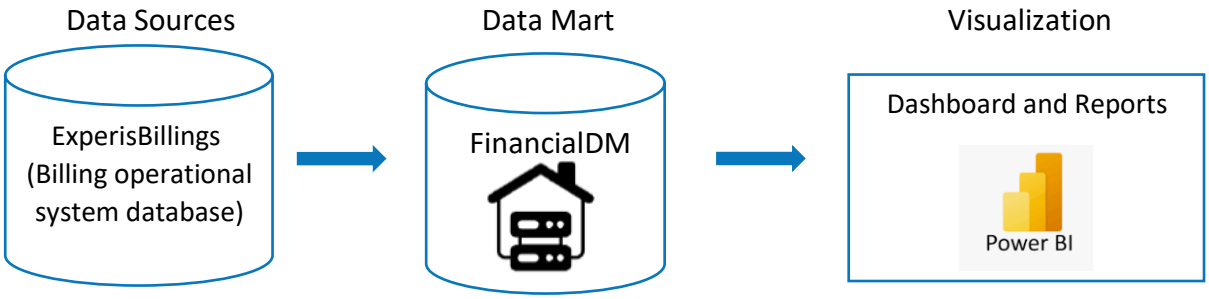
3.Technical Specification

3.1 Prerequisites

SQL Server	Billing operational system database - ExperisBillings
Data refresh processes	Definition of JOBS in SSMS
Power BI	Creating reports and dashboards using Power BI

3.2 Solution Architecture

3.2.1 High Level Design



3.2.2 Power BI Dashboard And Reports:

Executive dashboard:

* Number of active customers
* Number of active employees
* Number of invoices
* Total Expenses
* Total Customer Billing
* Employee average age
* Employee average seniority
* EBIT (Earnings before interest and taxes) Current Year
* Net_Profit Current Year
* Average profitability per employee
* Number Of Employees By Customer And Billing Type
* Top 5 Employees By Payroll
* Employees Payroll and Customer Billing Diff By Month Year

Customers Details And Billing Rate Report:

* Number of active customers
* Number of invoices
* Number of unissued invoices
* Average monthly billing
* Average daily billing
* Average hourly billing

* Number Of Employees By Customer and Billing Type
* Employees Payroll and Customer Billing Diff By Month Year
* Growth /Reduced Customer Billing Over Year
  using MOM (Month Over Month) change%
* Customers Details Table – Customer Image ,Contact Name ,Billing ,City, Country

Employees Payroll Report:

* Total working hours
* Total employees payment
* Average monthly payment
* Average daily payment
* Average hourly payment
* Average hourly salary and age by seniority
* Average monthly salary by seniority
* Number Of Un/Reported Attendances And Un/Approved Attendances
  Un/Approved Absences By Absence Type
* Approved Absences
* Total Expenses
* Employees Details Table – Employee Image, Employee Name, Department, Role, Salary, Update Salary

Employees Report:

* Number of active employees
* Average age
* Average seniority
* Average max days absence_vacation
* Average max days absence_sick
* Number of employees by department
* Number of employees by role
* Gender%
* Number Of Employees By Seniority
* Number Of Employees By Payment Type
* Number Of Employees By City
* Employees Details Table –Employee Image, Employee Name ,Hire Date, Department, Role, Salary, Update Salary

Customers Report:

* Table – Customer Image, Employee Image, Employee Name, Seniority, Department, Role, Salary, Update Salary, Customer Billing, Update Customer Billing Rate.

4. Functional Specification

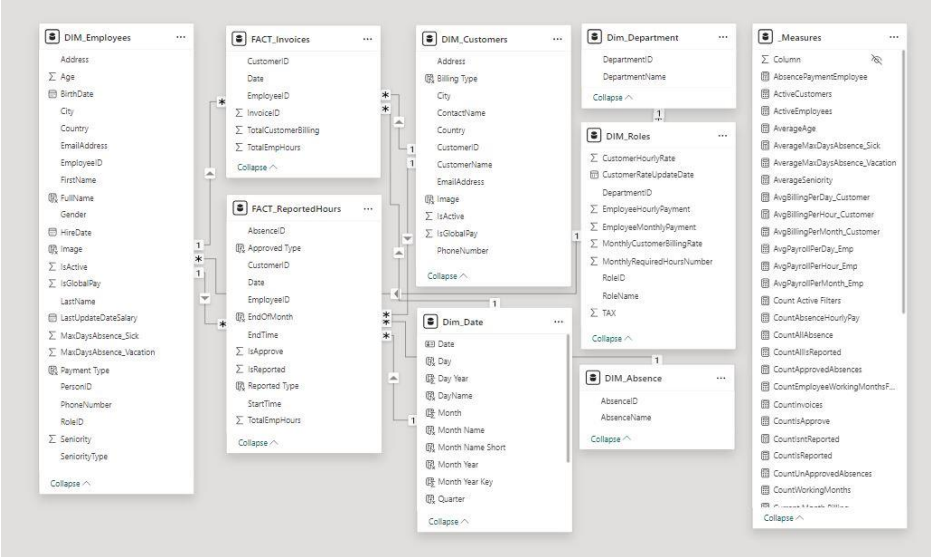
4.1 ERD model

ERD model of the FinancialDM Data Mart: ERD Link

4.2 Visualization in Power BI:

4.2.1 Model:

The dashboard and the reports were created using Power BI Desktop and published to Power BI Service. The Power BI model includes 2 Fact tables and 5 Dimension tables (not including history tables).A Dim_Date table was added to the Model.



4.2.2 DAX Measures:

To create the visuals, the following measures were created with DAX:

- ActiveCustomers = COUNTX(FILTER(DIM_Customers,DIM_Customers[IsActive]=1),DIM_Customers[IsActive])+0
- ActiveEmployees = CALCULATE(DISTINCTCOUNT(FACT_ReportedHours[EmployeeID]),DIM_Employees[IsActive]=1)+0
- Gender% = COUNT(DIM_Employees[Gender])/CALCULATE(COUNT(DIM_Employees[Gender]),ALL(DIM_Employees[Gender]))+0

- HourlyCustomersBilling = CALCULATE(SUMX(FACT_ReportedHours,FACT_ReportedHours[TotalEmpHours]*RELATED(DIM_Roles[CustomerHourlyRate])),FILTER(FACT_ReportedHours,RELATED(DIM_Customers[IsGlobalPay])=0 && FACT_ReportedHours[IsApprove]=1))
- GlobalCustomersBilling = CALCULATE(SUM(DIM_Roles[MonthlyCustomerBillingRate])*[CountWorkingMonths],FILTER(FACT_ReportedHours,RELATED(DIM_Customers[IsGlobalPay])=1))

- TotalCustomerBillingBeforeTAX = [HourlyCustomersBilling]+[GlobalCustomersBilling]
- TotalCustomerBillingIncludeTAX = [TotalCustomerBillingBeforeTAX]*1.17

- CountAbsenceHourlyPay = COUNTX(FILTER(FACT_ReportedHours,FACT_ReportedHours[IsApprove]=1 && FACT_ReportedHours[AbsenceID] <> 0 && RELATED(DIM_Employees[IsGlobalPay])=0),FACT_ReportedHours[IsApprove])
- AbsencePaymentEmployee = SUMX(DIM_Roles,DIM_Roles[EmployeeHourlyPayment]*8*[CountAbsenceHourlyPay])
- HourlyPaymentSalary_Emp = SUMX(FILTER(FACT_ReportedHours,RELATED(DIM_Employees[IsGlobalPay])=0 && FACT_ReportedHours[IsApprove]=1),FACT_ReportedHours[TotalEmpHours]*RELATED(DIM_Roles[EmployeeHourlyPayment]))
- TotalHourlyPayment_Emp = [AbsencePaymentEmployee]+[HourlyPaymentSalary_Emp]
- CountWorkingMonths = CALCULATE(DISTINCTCOUNT(FACT_ReportedHours[EndOfMonth]),YEAR(FACT_ReportedHours[Date])&& FACT_ReportedHours[EndOfMonth]< TODAY())
- GlobalPaySalary_Emp = CALCULATE(SUM(DIM_Roles[EmployeeMonthlyPayment])*[CountWorkingMonths],FILTER(DIM_Employees,DIM_Employees[IsGlobalPay]=1))
- TotalEmployeesPayroll = [TotalHourlyPayment_Emp]+[GlobalPaySalary_Emp]
- TotalVariablExpenses = [TotalEmployeesPayroll]*0.125+[TotalEmployeesPayroll]*0.076
  (Explanation: 0.125 - Compensation and benefits pension insurance
  0.076 - Social Security)
- TotalExpenses = [TotalEmployeesPayroll]+[TotalVariablExpenses]
- TotalWorkingHours = SUMX(FILTER(FACT_ReportedHours,FACT_ReportedHours[IsApprove]=1),FACT_ReportedHours[TotalEmpHours])+0
- TotalRequiredHours = SUMX(FACT_Invoices,RELATED(DIM_Roles[MonthlyRequiredHoursNumber]))+0
- Diff EmpPayroll and CustomerBilling = [TotalCustomerBillingBeforeTAX]-[TotalEmployeesPayroll]
- MoM Change% = DIVIDE([Current Month Billing] - [Previous Month Billing],[Previous Month Billing],0)

- CountAllIsReported = COUNT(FACT_ReportedHours[IsReported])+0
- CountApprovedAbsences = CALCULATE(COUNT(FACT_ReportedHours[IsApprove]),FACT_ReportedHours[IsApprove]=1,FACT_ReportedHours[AbsenceID]<>0)+0

- CountUnApprovedAbsences =
  CALCULATE(COUNT(FACT_ReportedHours[IsApprove]),FACT_ReportedHours[IsApprove]=0,FACT_ReportedHours[AbsenceID]<>0)+0
- CountAllAbsence = [CountApprovedAbsences]+[CountUnApprovedAbsences]
- CountInvoices = DISTINCTCOUNT(FACT_Invoices[InvoiceID])+0
- CountUnissuedInvoices =
  DATEDIFF(MAX(FACT_Invoices[Date]),EOMONTH(TODAY(),0),MONTH)+0

- AvgPayrollPerMonth_Emp =
  DIVIDE([TotalEmployeesPayroll],DISTINCTCOUNT(FACT_Invoices[Date]))+0
- AvgPayrollPerDay_Emp =
  DIVIDE([TotalEmployeesPayroll],DISTINCTCOUNT(FACT_ReportedHours[Date]))+0
- AvgPayrollPerHour_Emp =
  DIVIDE([TotalEmployeesPayroll],SUM(FACT_ReportedHours[TotalEmpHours]))+0
- AverageAge = AVERAGEX(DIM_Employees,DIM_Employees[Age])+0
- AvgBillingPerHour_Customer =
  DIVIDE([TotalCustomerBillingBeforeTAX],SUM(FACT_Invoices[TotalEmpHours]))+0
- AvgBillingPerDay_Customer =
  DIVIDE([TotalCustomerBillingBeforeTAX],DISTINCTCOUNT(FACT_ReportedHours[Date]))+0
- AvgBillingPerMonth_Customer =
  DIVIDE([TotalCustomerBillingBeforeTAX],DISTINCTCOUNT(FACT_Invoices[Date]))+0
- AverageMaxDaysAbsence_Vacation =
  AVERAGEX(DIM_Employees,DIM_Employees[MaxDaysAbsence_Vacation])+0
- AverageMaxDaysAbsence_Sick =
  AVERAGEX(DIM_Employees,DIM_Employees[MaxDaysAbsence_Sick])+0
- AverageSeniority = AVERAGEX(DIM_Employees,DIM_Employees[Seniority])+0
- AvgProfitPerEmployeeByCustomer =
  DIVIDE([TotalCustomerBillingBeforeTAX],[ActiveEmployees])

- EBIT = [TotalCustomerBillingIncludeTAX]-[TotalExpenses]
- NET_Profit = [EBIT]*0.83

- Count Active Filters =
  VAR employee = IF(ISFILTERED(DIM_Employees[FullName]),1,0)
  VAR customer = IF(ISFILTERED(DIM_Customers[CustomerName]),1,0)
  VAR year = IF(ISFILTERED(Dim_Date[Year]),1,0)
  VAR month = IF(ISFILTERED(Dim_Date[Month Name]),1,0)
  VAR department = IF(ISFILTERED(Dim_Department[DepartmentName]),1,0)
  VAR role = IF(ISFILTERED(DIM_Roles[RoleName]),1,0)
  VAR payment_type = IF(ISFILTERED(DIM_Employees[Payment Type]),1,0)
  VAR billing_type = IF(ISFILTERED(DIM_Customers[Billing Type]),1,0)
  VAR seniority = IF(ISFILTERED(DIM_Employees[Seniority]),1,0)

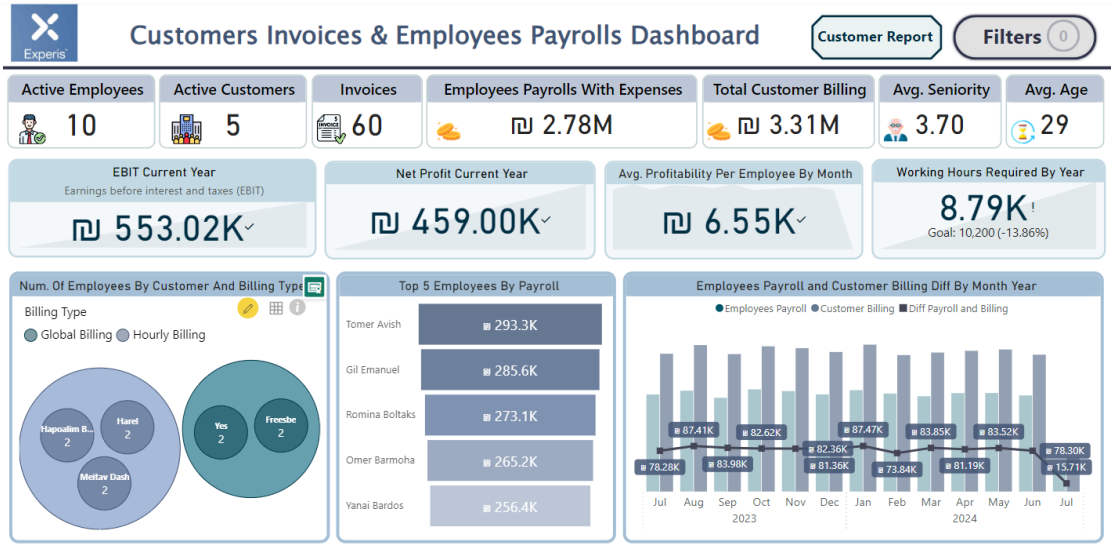
```
VAR filter_count =
employee+customer+year+month+department+role+payment_type+billing_type+seniority
RETURN filter_count & ""
```

4.2.3 Dashboard & Reports:

Customers Invoices & Employees Payrolls Dashboard:

The dashboard was created to provide a wider perspective on the company's status, it includes the main KPIs and general graphs.

With the "Customer Report" button, you can access a detailed customer report.



KPI Cards:

- Average Age
- Average Seniority
- Total Customer Billing
- Total Expenses
- Count Invoices
- Count Active Customers
- Count Active Employees
- EBIT (Earnings before interest and taxes) Current Year
- Net_Profit Current Year
- Average Profitability Per Employee By Month
- Working Hours Required By Year

Buttons:

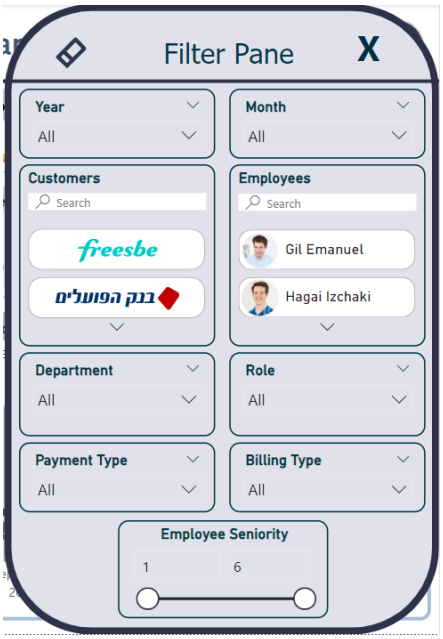
- Customer Report
- Filters

Graphs:

- Number Of Employees By Customer And Billing Type
- Top 5 Employees By Payroll
- Employees Payroll and Customer Billing Diff By Month Year

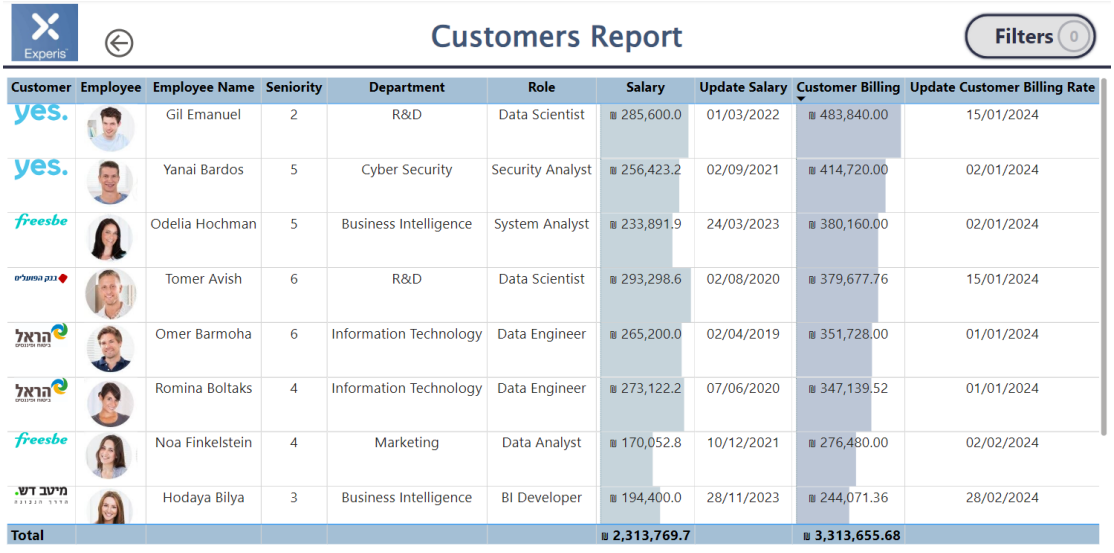
Filter Pane:

Using the "Filters" Button on the top right of the report, the user can slice the data by Year, Month, Customer, Employee, Department, Role, Seniority, Payment Type and Billing Type. This Button appears in every report on the top right.
In the filter pane on the top left, there is an option to clear all slicers.



Customer Report:

The customer analysis report will include data regarding Experis's employees by customer.



Customer	Employee	Employee Name	Seniority	Department	Role	Salary	Update Salary	Customer Billing	Update Customer Billing Rate
yes.		Gil Emanuel	2	R&D	Data Scientist	285,600.0	01/03/2022	483,840.00	15/01/2024
yes.		Yanai Bardos	5	Cyber Security	Security Analyst	256,423.2	02/09/2021	414,720.00	02/01/2024
freesbe		Odelia Hochman	5	Business Intelligence	System Analyst	233,891.9	24/03/2023	380,160.00	02/01/2024
בנק הפועלים		Tomer Avish	6	R&D	Data Scientist	293,298.6	02/08/2020	379,677.76	15/01/2024
הראל		Omer Barmoha	6	Information Technology	Data Engineer	265,200.0	02/04/2019	351,728.00	01/01/2024
הראל		Romina Boltaks	4	Information Technology	Data Engineer	273,122.2	07/06/2020	347,139.52	01/01/2024
freesbe		Noa Finkelstein	4	Marketing	Data Analyst	170,052.8	10/12/2021	276,480.00	02/02/2024
מיטב דש		Hodaya Bilya	3	Business Intelligence	BI Developer	194,400.0	28/11/2023	244,071.36	28/02/2024
Total						2,313,769.7		3,313,655.68	

Graphs:

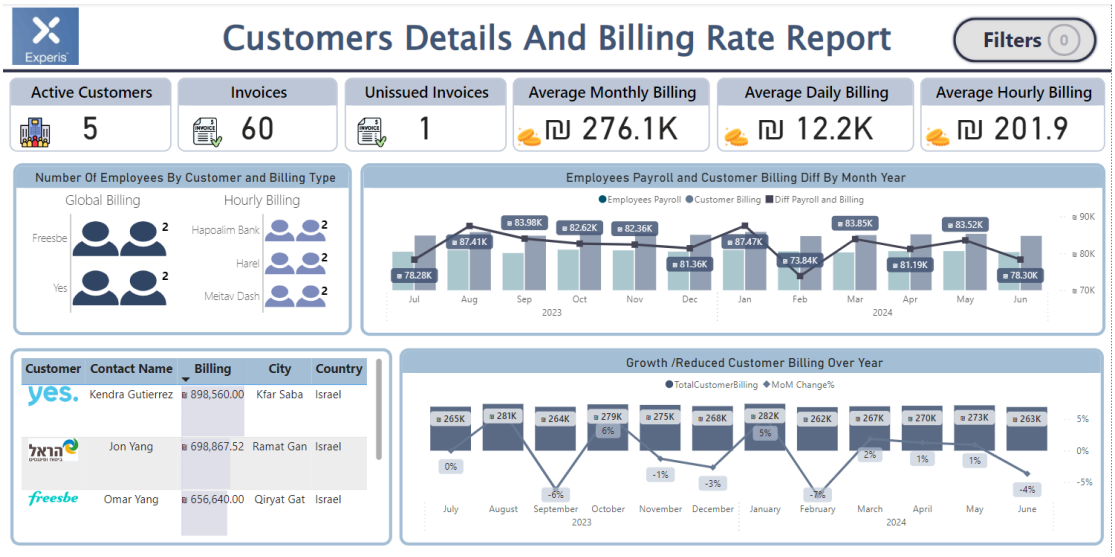
- Table – Customer Image, Employee Image, Employee Name, Seniority, Department, Role, Salary, Update Salary, Customer Billing, Update Customer Billing Rate.

Button:

- Filters

<u>Customers Details And Billing Rate Report:</u>

The customer analysis report will include data regarding Experis's customers and customer invoices.



KPI Cards:

- Average Monthly Billing
- Average Daily Billing
- Average Hourly Billing
- Count Invoices
- Count Unissued Invoices
- Count Active Customers

Graphs:

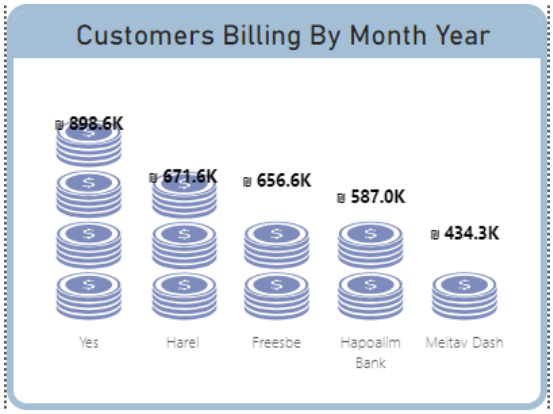
- Number Of Employees By Customer and Billing Type
- Employees Payroll and Customer Billing Diff By Month Year
- Growth /Reduced Customer Billing Over Year
- Customers Table – Customer Image ,Contact Name ,Billing ,City, Country

Button:

- Filters

Tooltip:

In the "Growth /Reduced Customer Billing over Year" graph, when mousing over one of the months a "Customers Billing By Month" tooltip is shown.



<u>Employees Payrolls Report:</u>

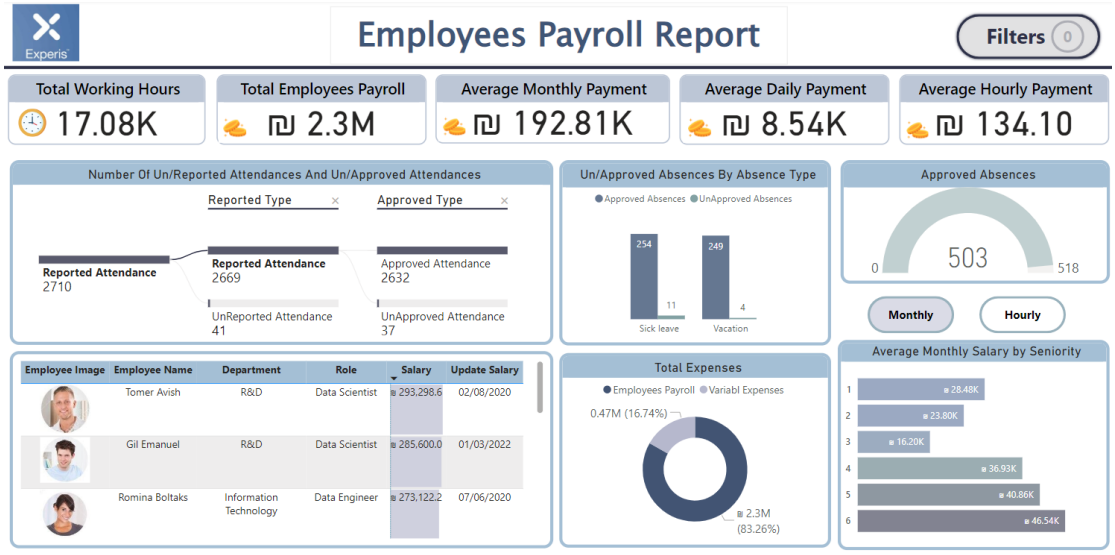
The employee payroll analysis report will include data regarding Experis's employee payrolls.

With bookmarks, I have incorporated two graphs:

•Average Monthly Salary by Seniority

•Average Hourly Salary and Age by Seniority

With the "Monthly" and "Hourly" buttons, you can switch the displayed graphs.



KPI Cards:

- Average Monthly Payment
- Average Daily Payment
- Average Hourly Payment
- Total Employees Payroll
- Total Working Hours

Graphs:

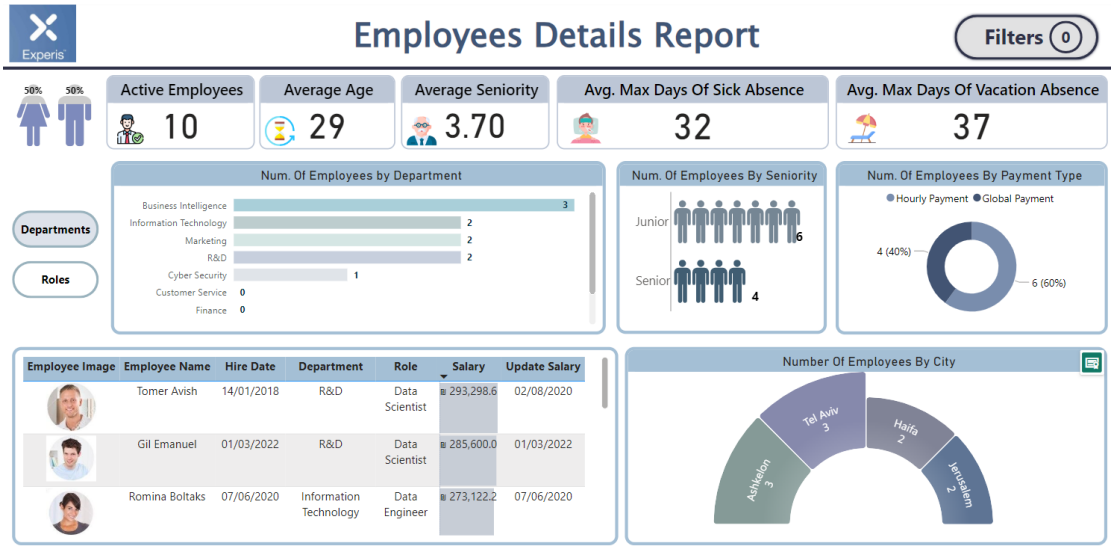
- Number Of Un/Reported Attendances And Un/Approved Attendances
- Un/Approved Absences By Absence Type
- Approved Absences
- Total Expenses
- Average Monthly Salary by Seniority
- Average Hourly Salary and Age by Seniority
- Employees Table – Employee Image, Employee Name, Department, Role, Salary, Update Salary

Button:

- Filters

<u>Employees Details Report:</u>

The employee analysis report will include data regarding Experis's employees.
With bookmarks, I have incorporated two graphs:
• Number Of Employees by Department
• Number Of Employees by Role
With the "Departments" and "Roles" buttons, you can switch the displayed graphs.



KPI Cards:

- AverageMaxDaysAbsence_Vacation
- AverageMaxDaysAbsence_Sick
- Average Seniority
- Average Age
- Count Active Employees
- Gender%

Graphs:

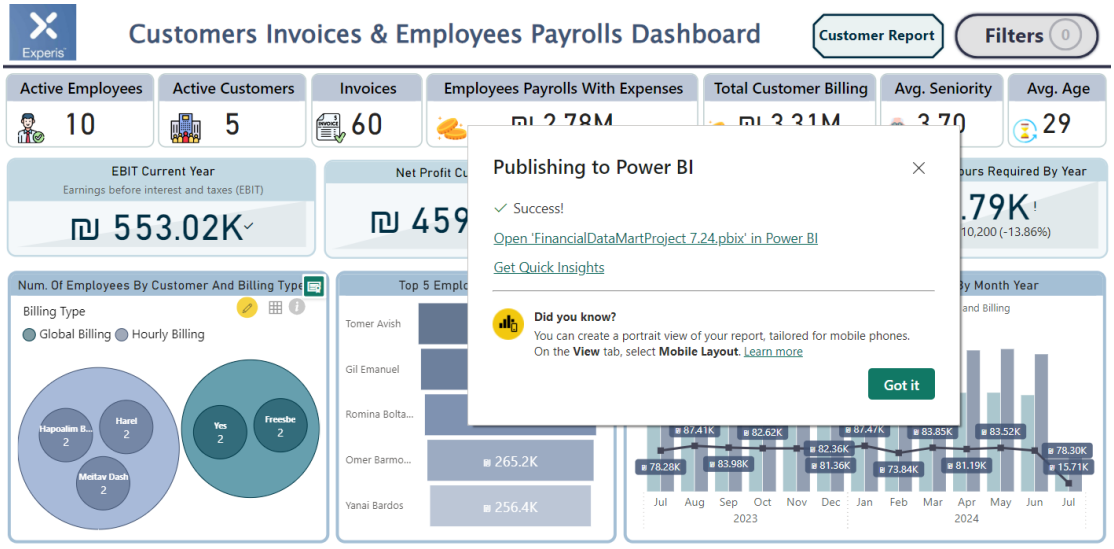
- Number Of Employees by Department
- Number Of Employees by Role
- Number Of Employees By Seniority
- Number Of Employees By Payment Type
- Number Of Employees By City
- Employees Table –Employee Image, Employee Name ,Hire Date, Department, Role, Salary, Update Salary

Button:

- Filters

4.2.4 Published To Power BI Service

After creating the dashboard and the reports in Power BI Desktop, they were published to Power BI Service, and an app was created -
Experis - Financial Data Mart Project– Odelia Hochman **Link** .



4.2.5 Data refresh processes

The data is refreshed daily at 5:00:00 (after the refresh of the data mart occurs), for this purpose, a personal gateway was created: