



Architectural Analysis and Design Patterns

Human Resource System

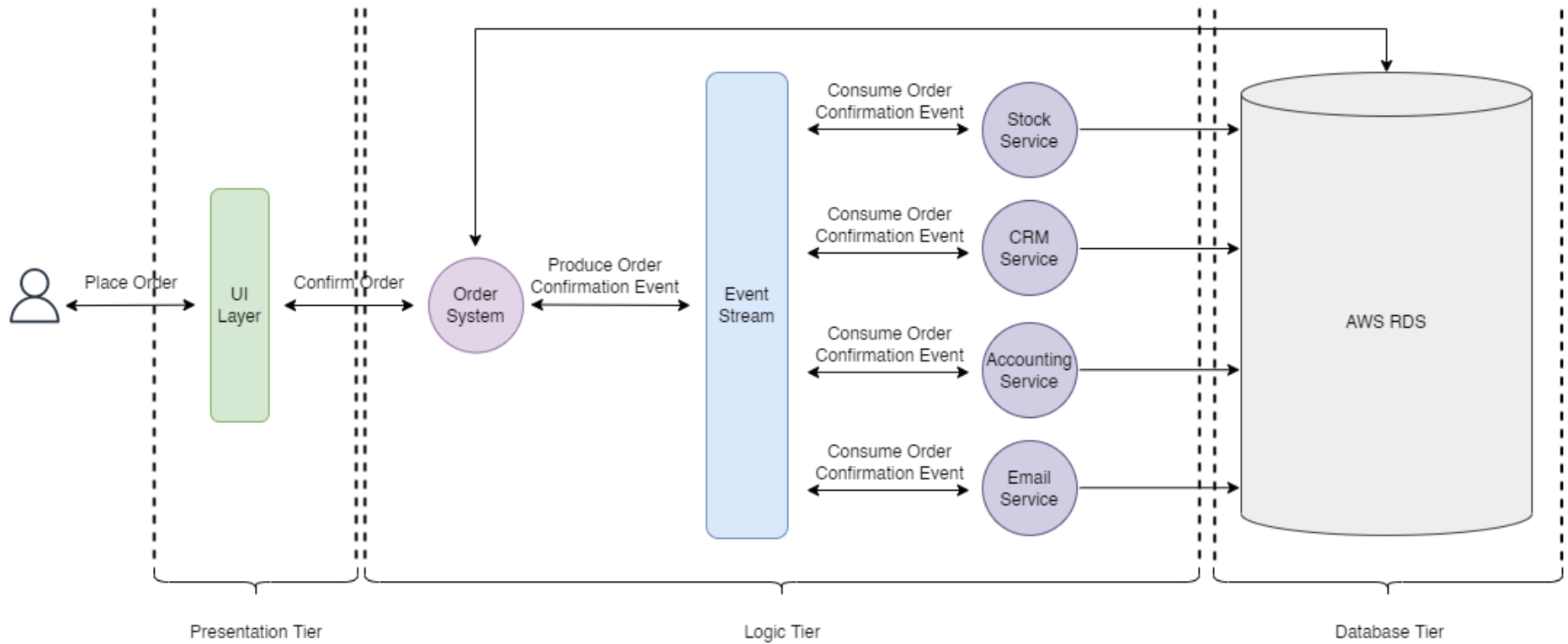


Figure 1: Event-Driven Microservice Architecture

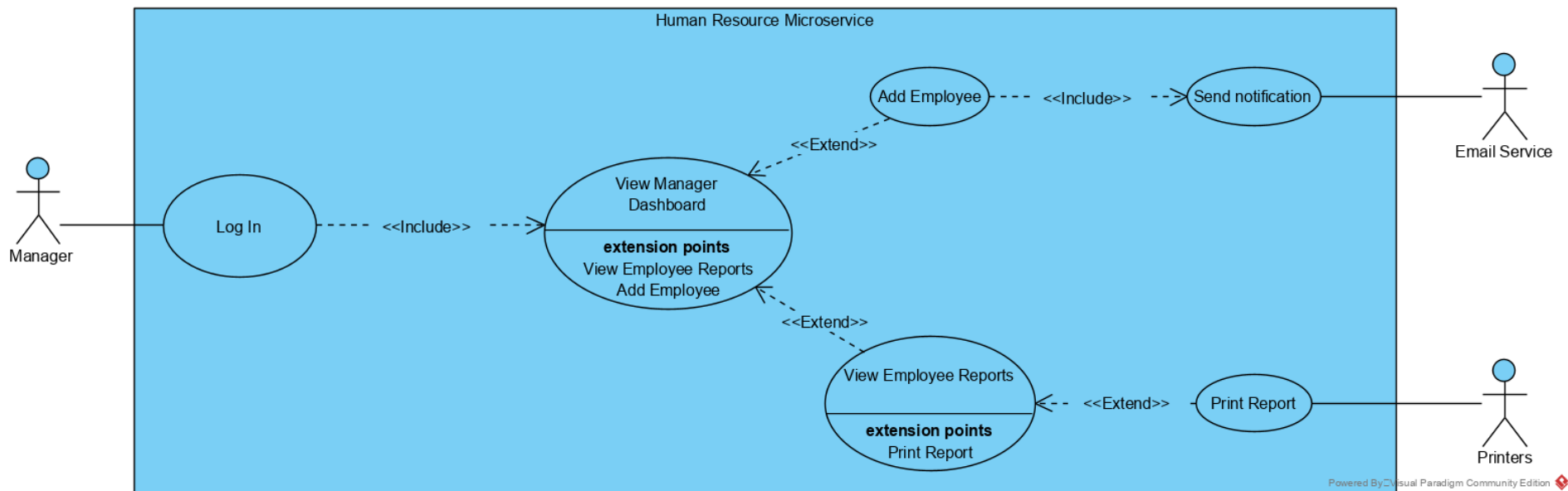


Figure 2: High level use case diagram

Table 1: User Login use case form

#	HR.UC001
Use Case Name	User Login
Description	The user logs into the system using their user credentials consisting of their unique email address (username) and a password.
Actors	User, Email Service
Precondition	User exists on the system as a manager
Main Flow of Events	<ol style="list-style-type: none">1. User enters their login credentials. [A1]2. User submits the information to the system.3. System validates the provided login details. [A2]4. System logs the user in and redirects to manager homepage [A3]
Alternative flow Of Events	<p>A1. User does not remember their login credentials. User can request to resend/reset their password via email using <i>Email Service</i> actor (E. "Forgot login details"). Return to step 1.</p> <p>A2. Invalid details entered, user must correct the incorrect details or reset their password using A1. Return to step 1.</p> <p>A3. User does not have the role of a manager to access restricted content. End of use case.</p>
Postcondition	User logged into the system and can access manager restricted contents of WeeBits HR system.
Issues	

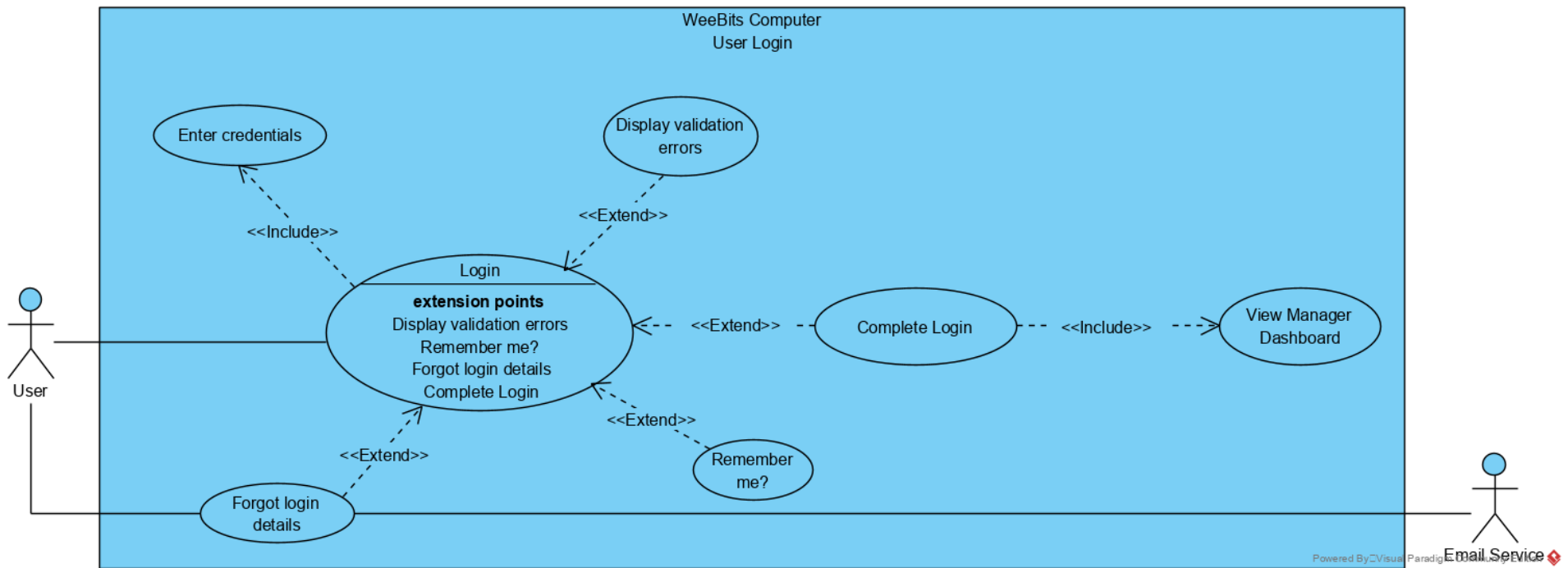


Figure 3: User Login use case diagram

Table 2: Add Employee use case form

#	HR.UC002
Use Case Name	Add Employee
Description	The logged in manager enters the employee details into the appropriate form and submits the form to add a new employee to the system.
Actors	Logged In Manager, Email Service
Precondition	The manager is logged into the system
Main Flow of Events	<ol style="list-style-type: none"> 1. Manager enters employee details. 2. Manager submits the information to the system. 3. System validates the provided information. [A1] 4. System adds a new employee record, sends welcome email via <i>Email Service</i> and displays a success message.
Alternative flow Of Events	<p>A1. Invalid details entered.</p> <p>The manager must correct the incorrect details.</p> <p>Return to step 1.</p>
Postcondition	A new employee is created with an appropriate associated role.
Issues	

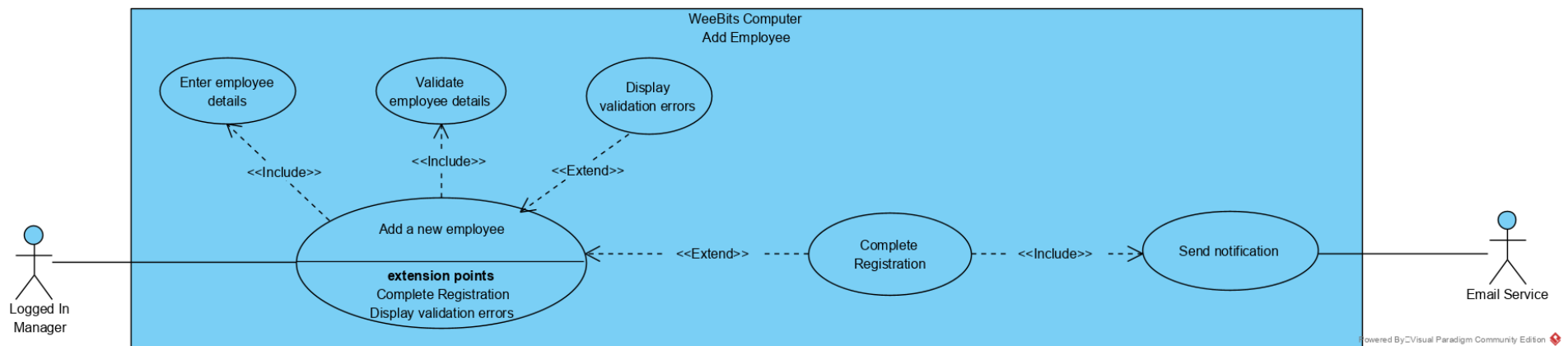


Figure 4:Add Employee use case diagram

Table 3: View Reports use case form

#	HR.UC003
Use Case Name	View Reports
Description	The manager selects a report type with optional filters and parameter to view the relevant report. The manager may choose to print a hard copy of the report on screen.
Actors	Logged In Manager, Printer
Precondition	The manager is logged into the system
Main Flow of Events	<ol style="list-style-type: none"> 1. Manager selects a report type. 2. Manager enters optional filters/report parameters and submits a new report generation request 3. System validates the provided information. [A1] 4. System displays the selected report [A2]
Alternative flow Of Events	<p>A1. Invalid filtering options/report parameters provided.</p> <p>The manager must correct the incorrect details.</p> <p>Return to step 1.</p> <p>A2. Manager may choose to send the report to printing facility (<i>Printer</i> actor) for printing (E "Print Report").</p> <p>End of use case.</p>
Postcondition	User logged into the system and can access manager restricted contents of WeeBits HR system.
Issues	

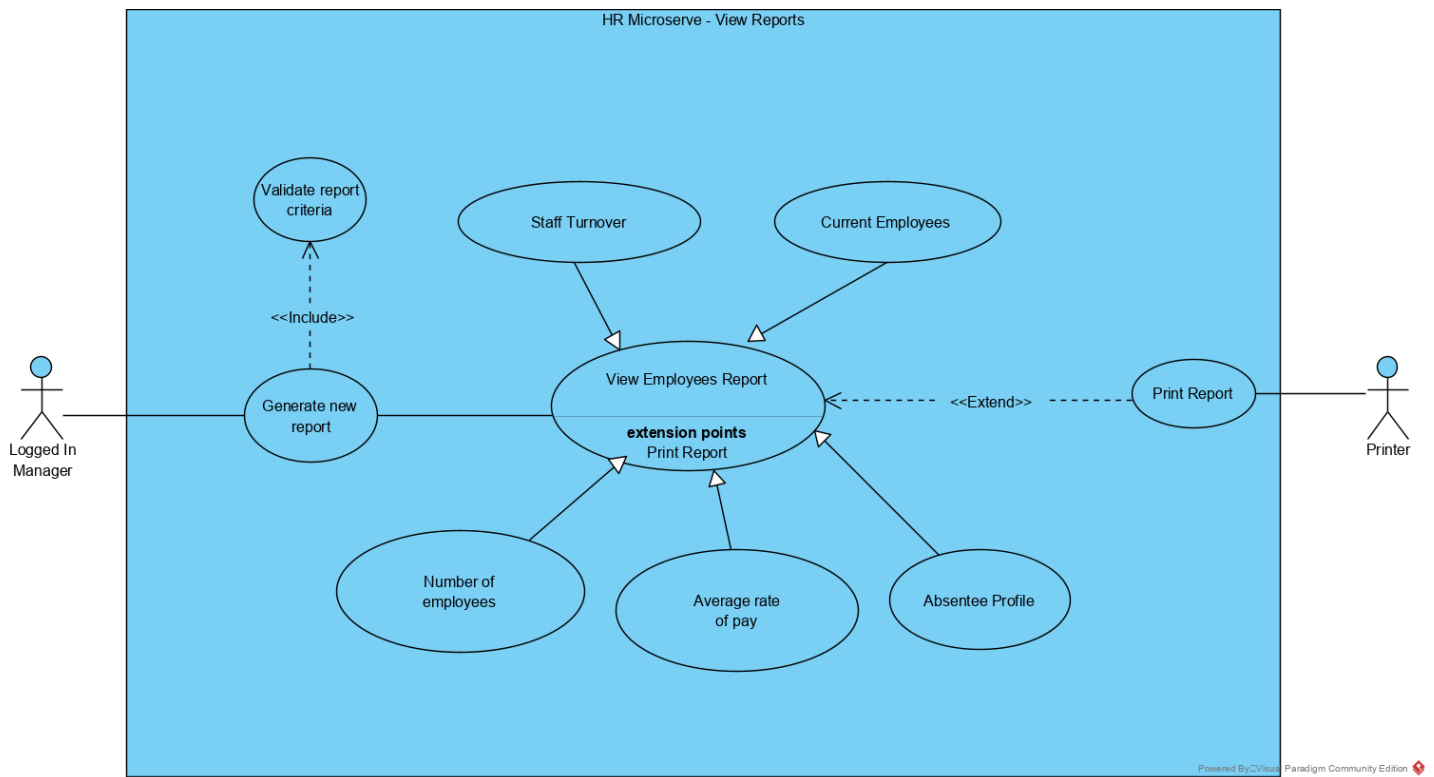


Figure 5: View Reports high level use case diagram

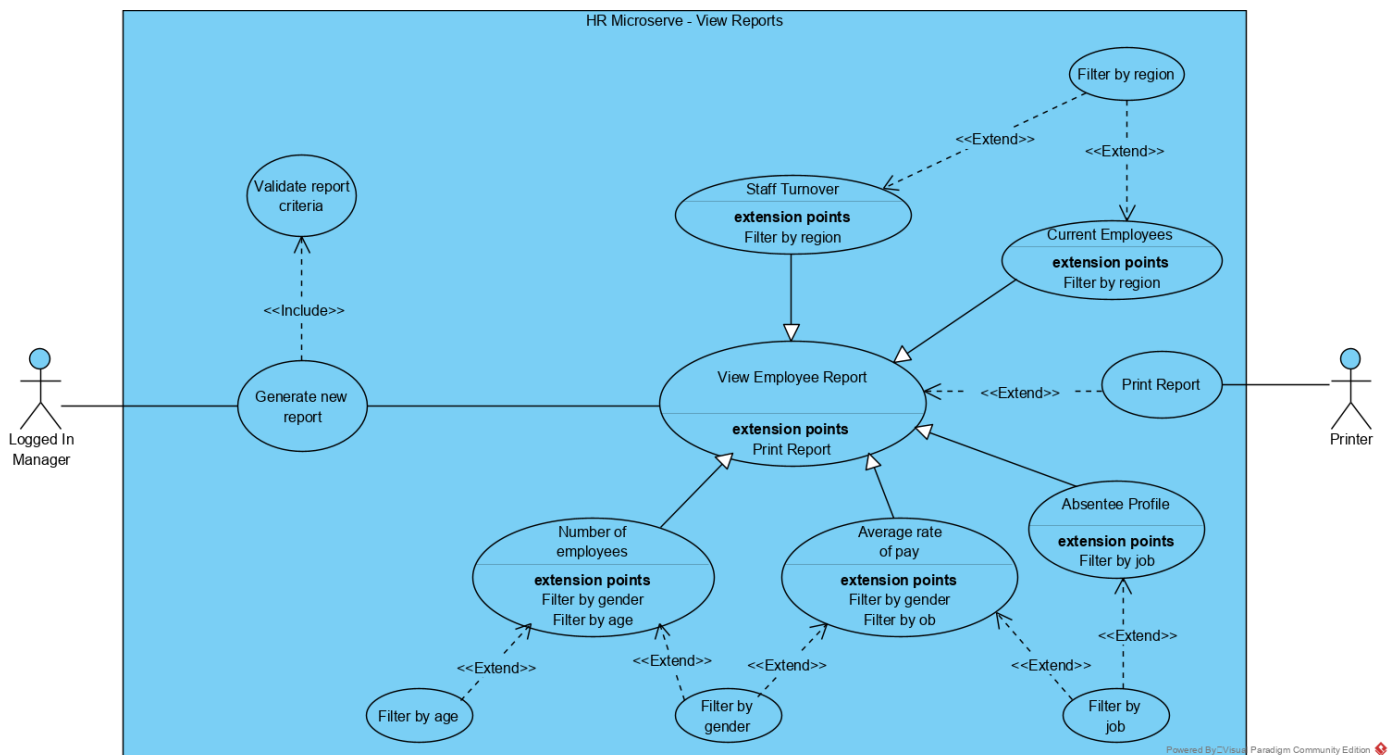


Figure 6: View Reports detailed use case diagram

Activity and Miscellaneous Diagrams

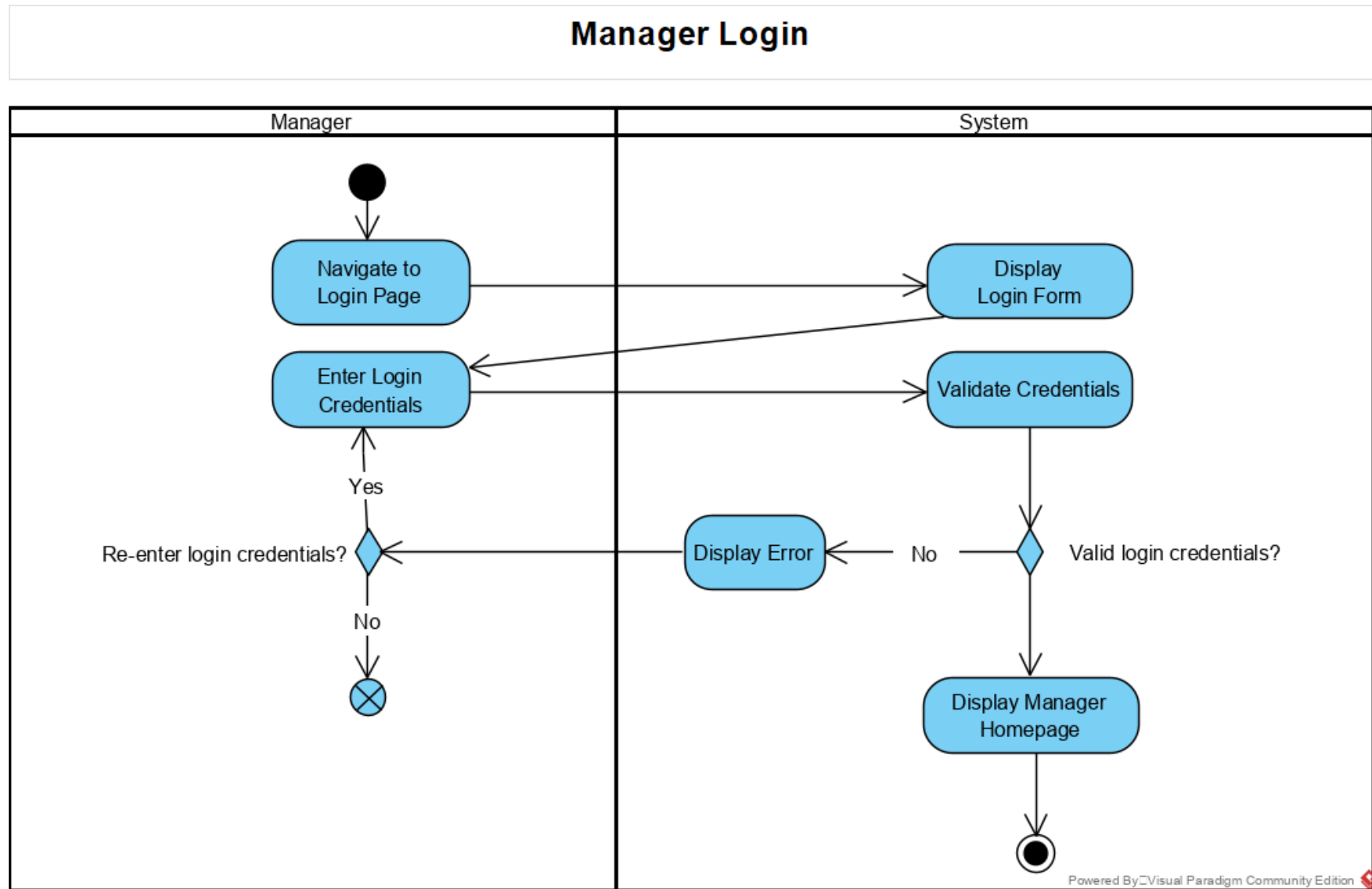


Figure 7: User/Manager Login activity diagram

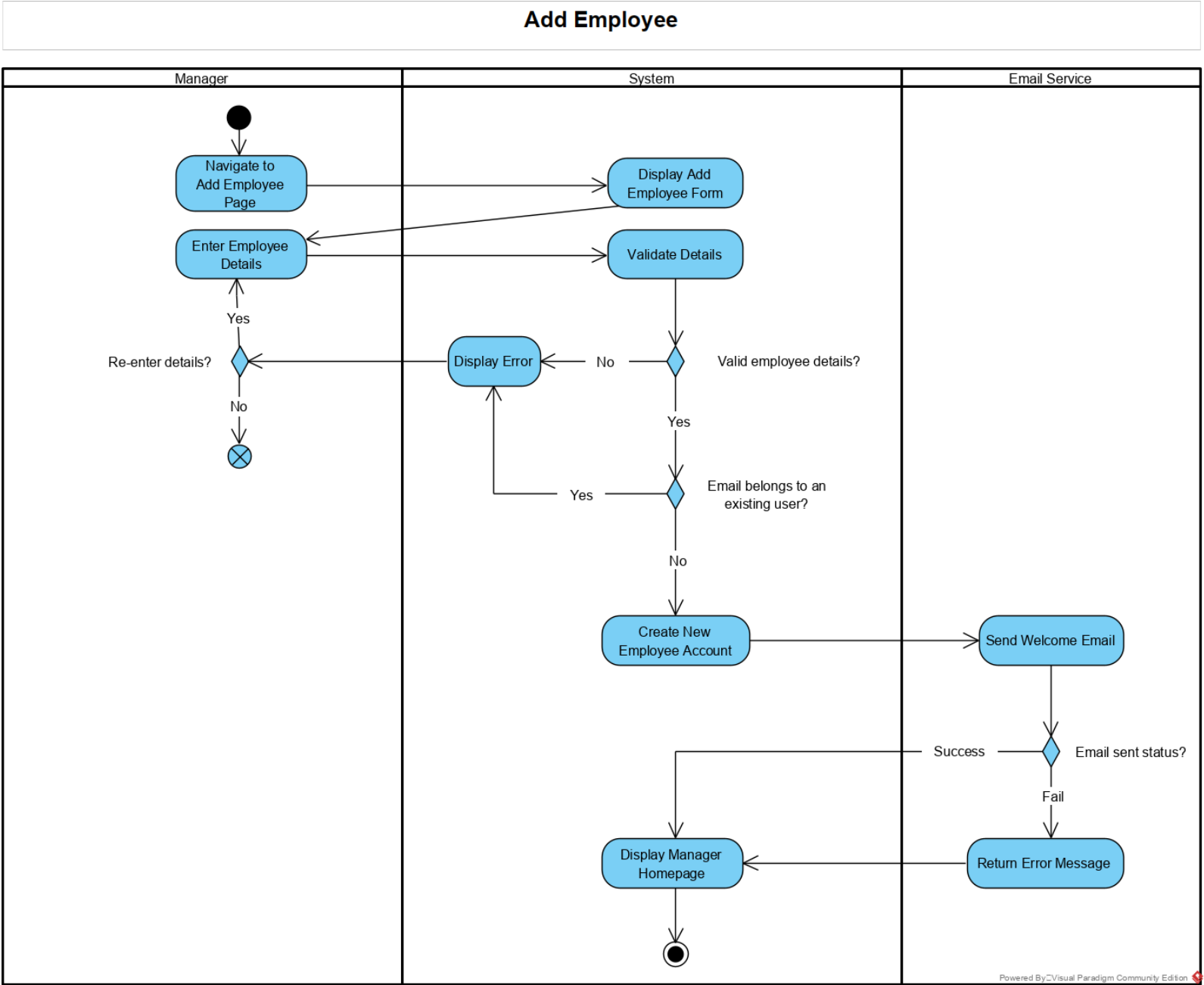


Figure 8: Add Employee activity diagram

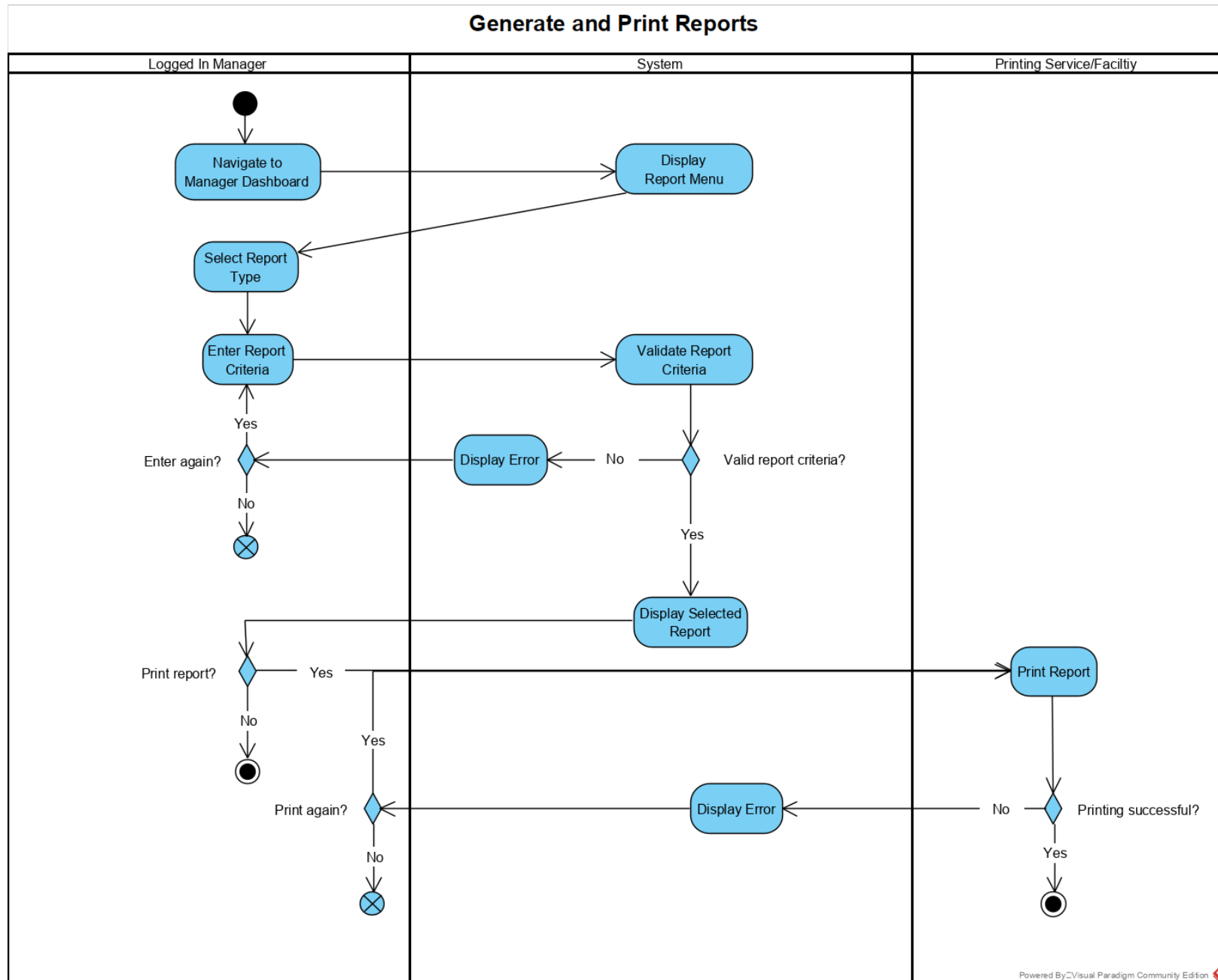


Figure 9: View Reports activity diagram

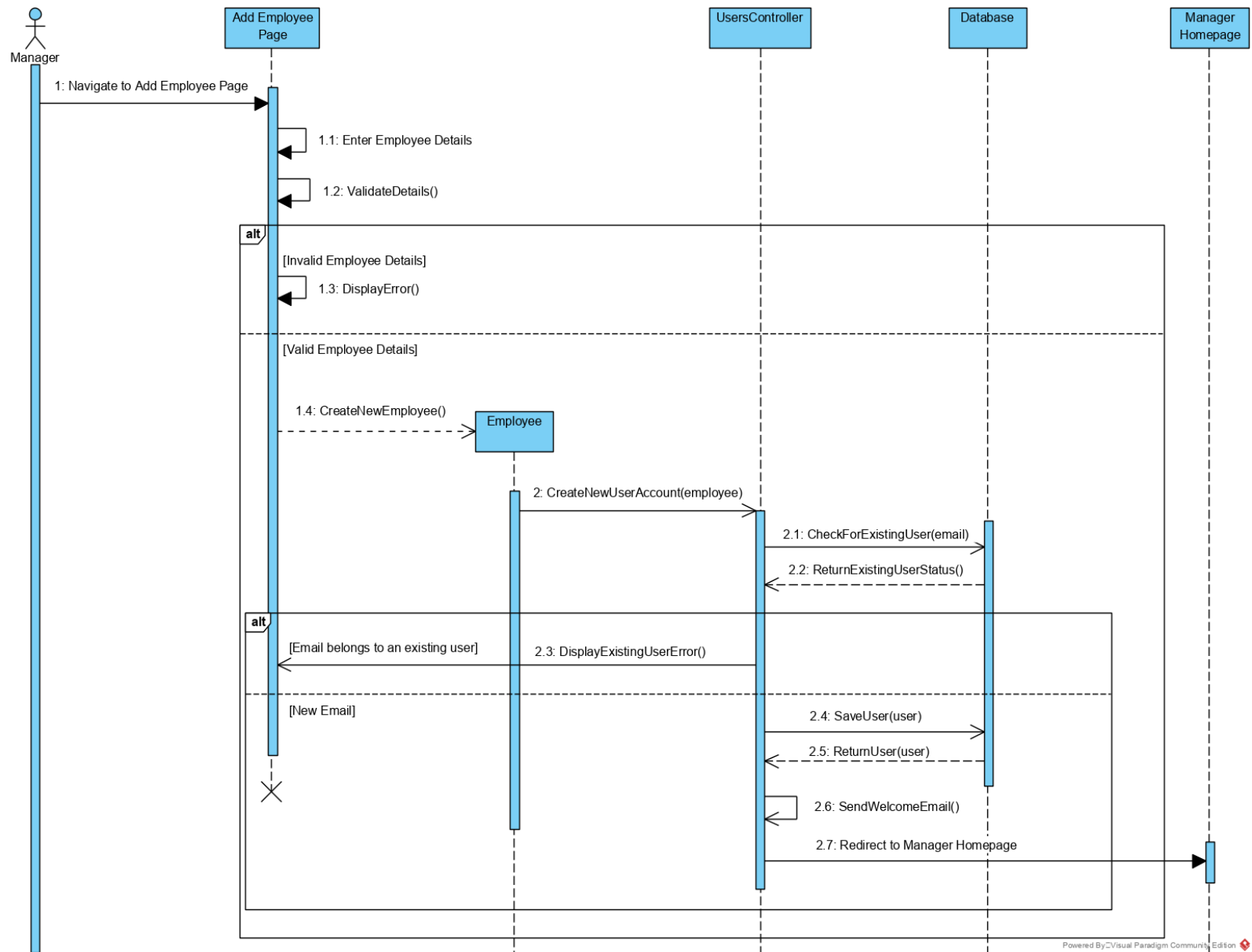


Figure 10: Add Employee sequence diagram

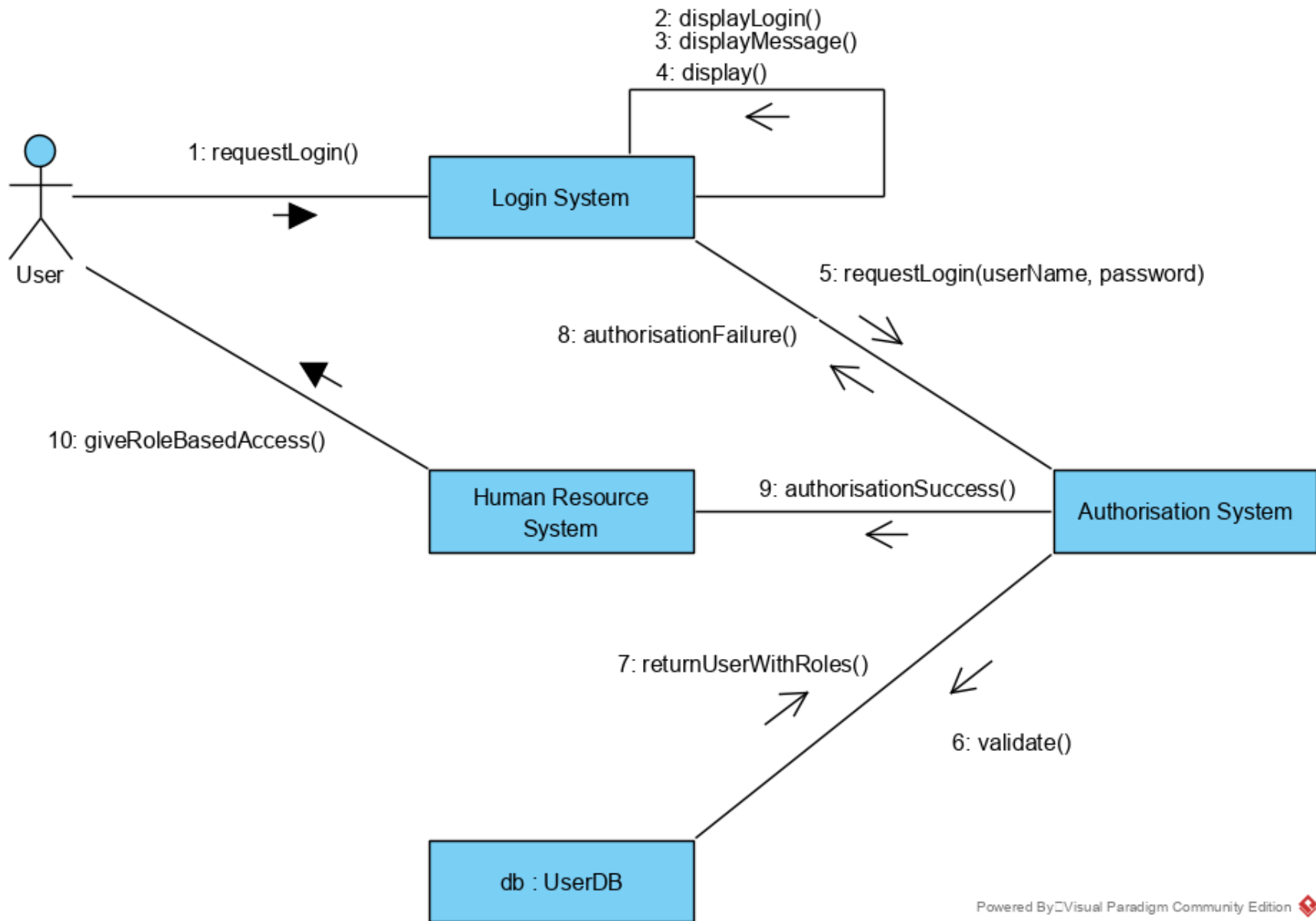


Figure 11: User Login communication diagram

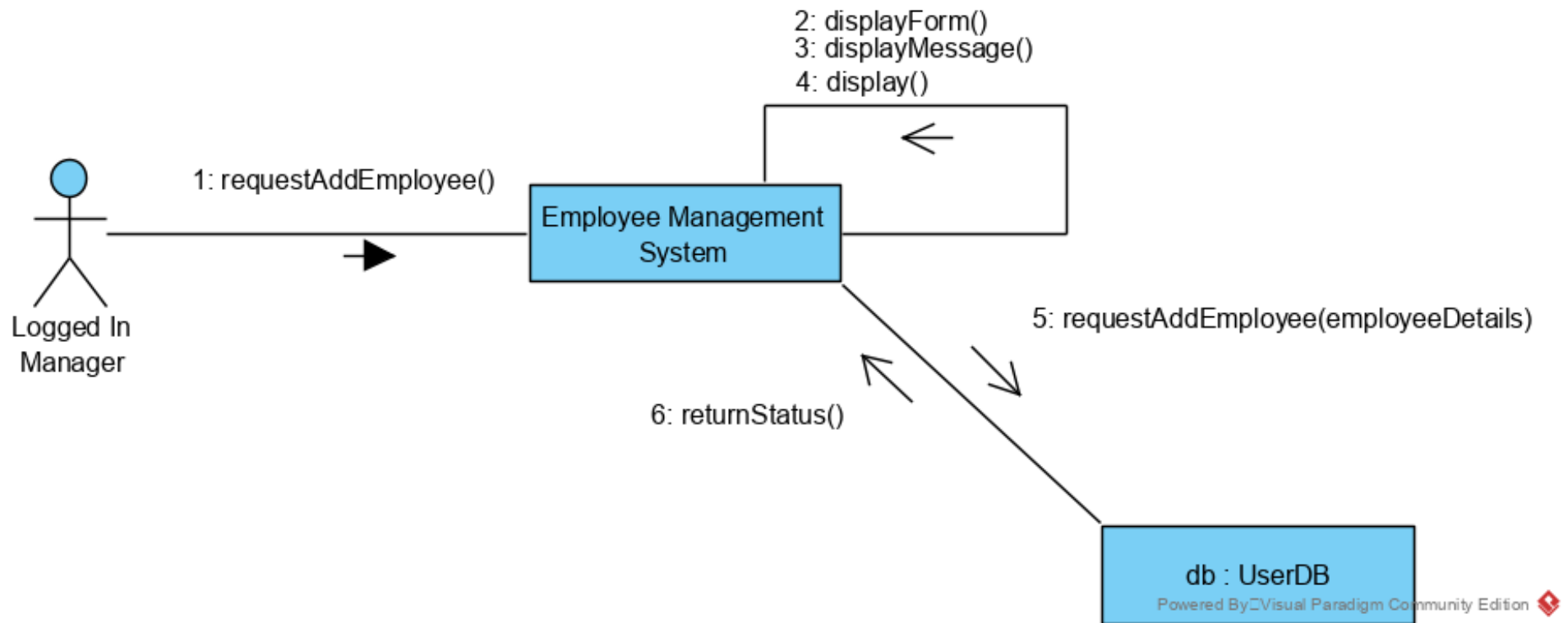


Figure 12: Add Employee communication diagram

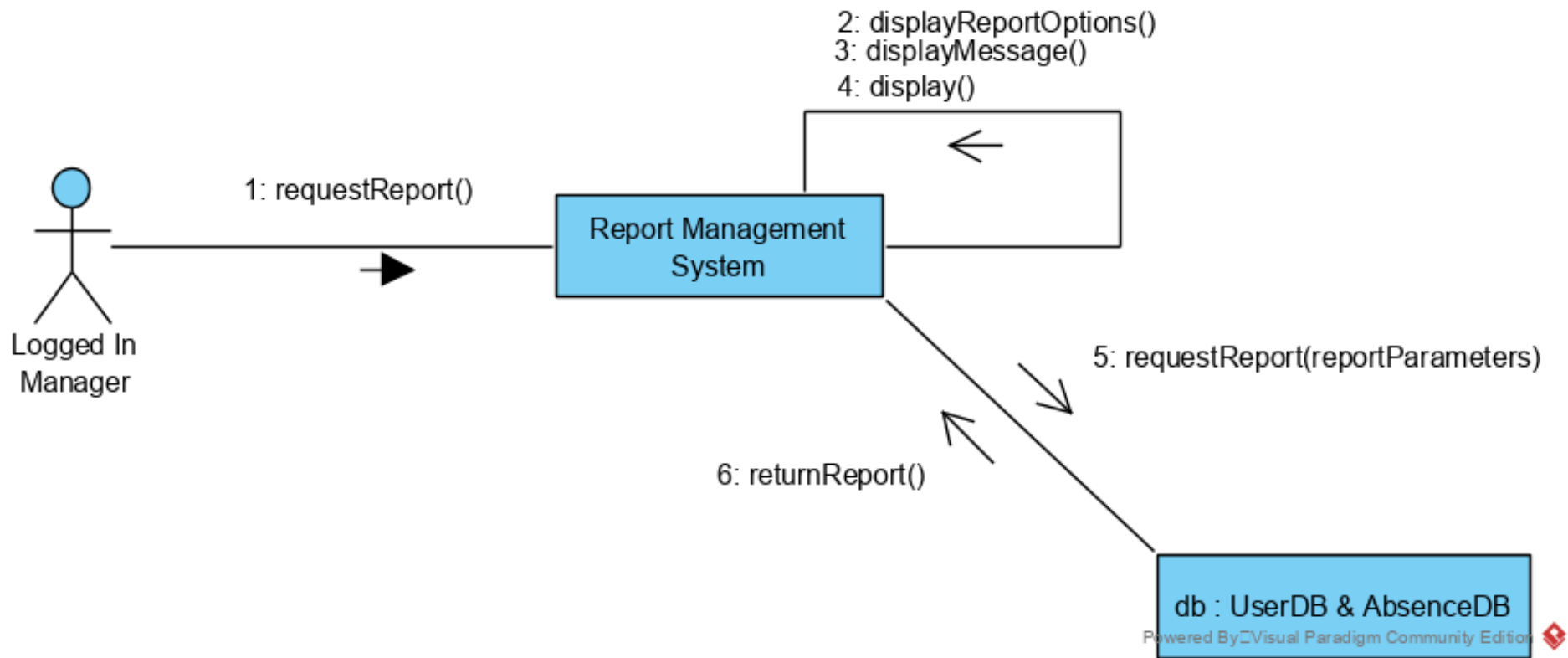


Figure 13: View Reports communication diagram

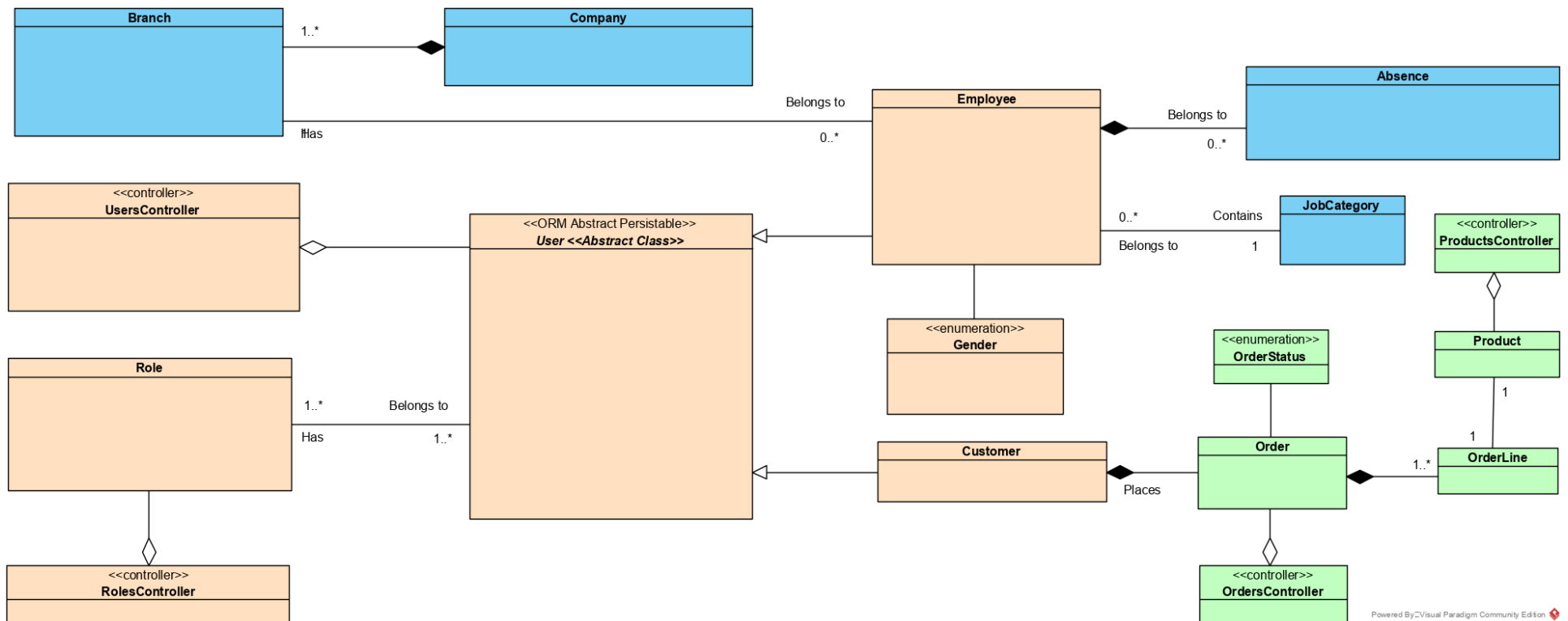


Figure 14: High level class diagram



18

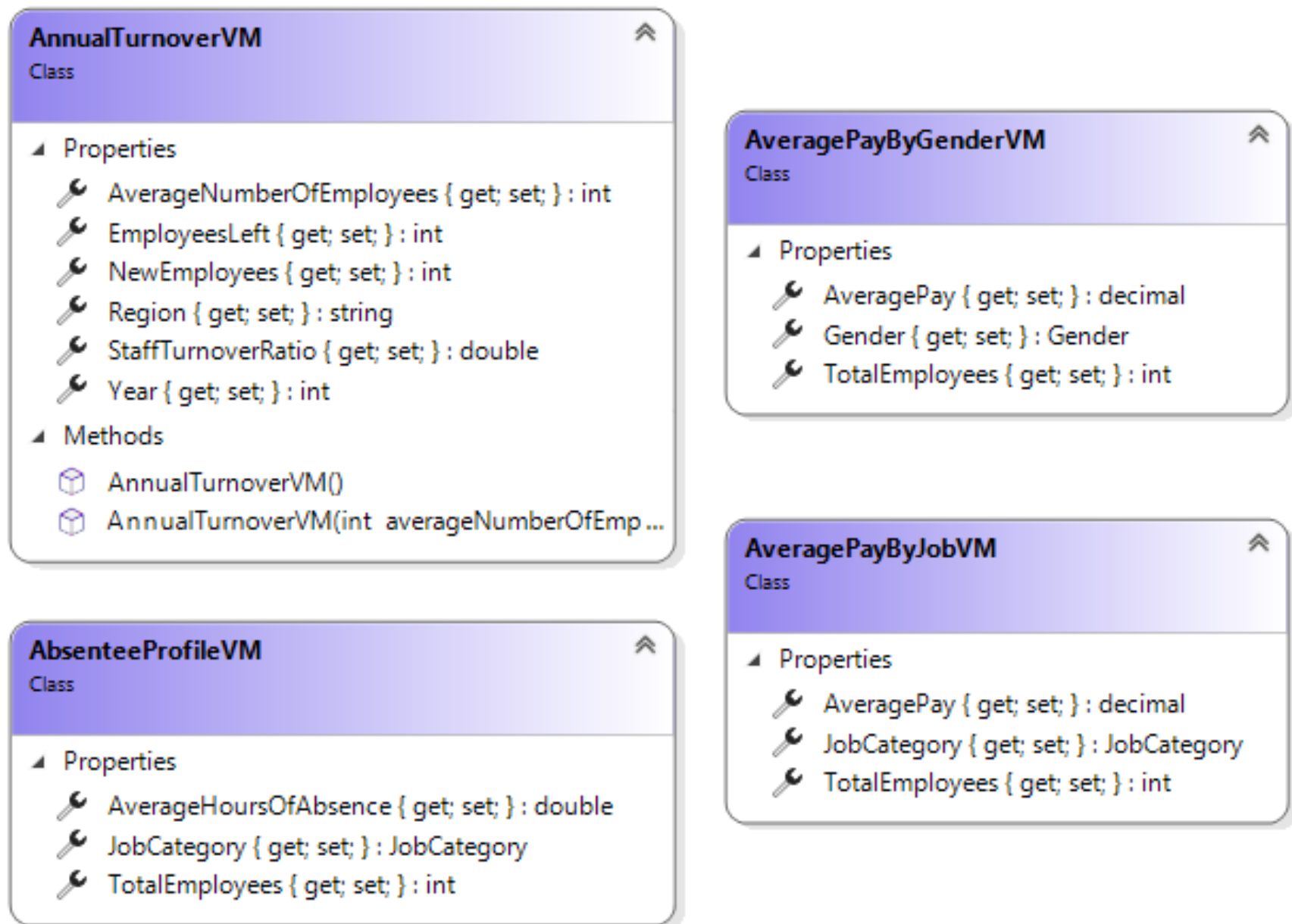


Figure 17: View Models class diagram (from Visual Studio)

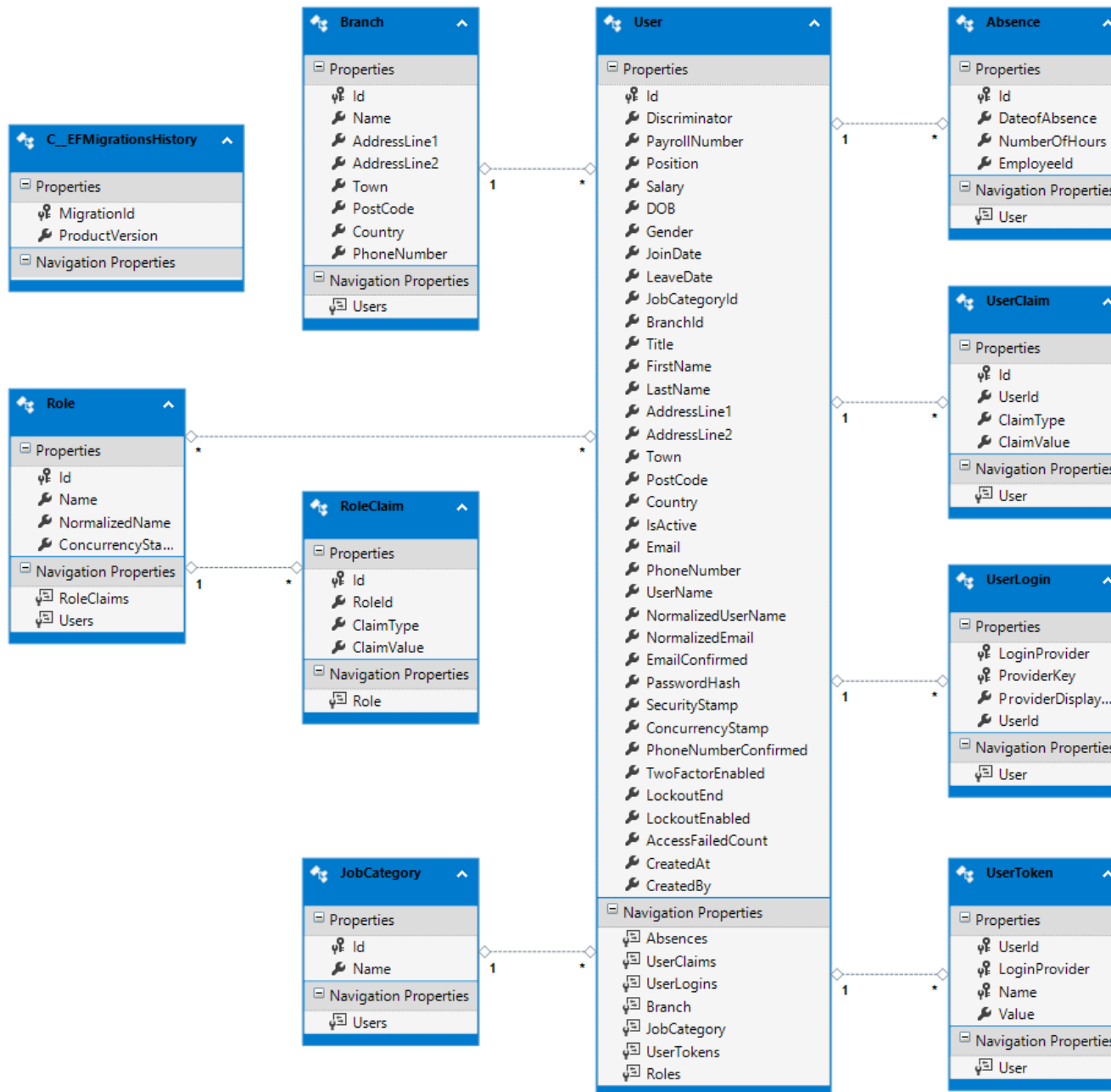


Figure 18: ADO.NET entity data model (from Visual Studio)

Appendix 1 – Sitemap

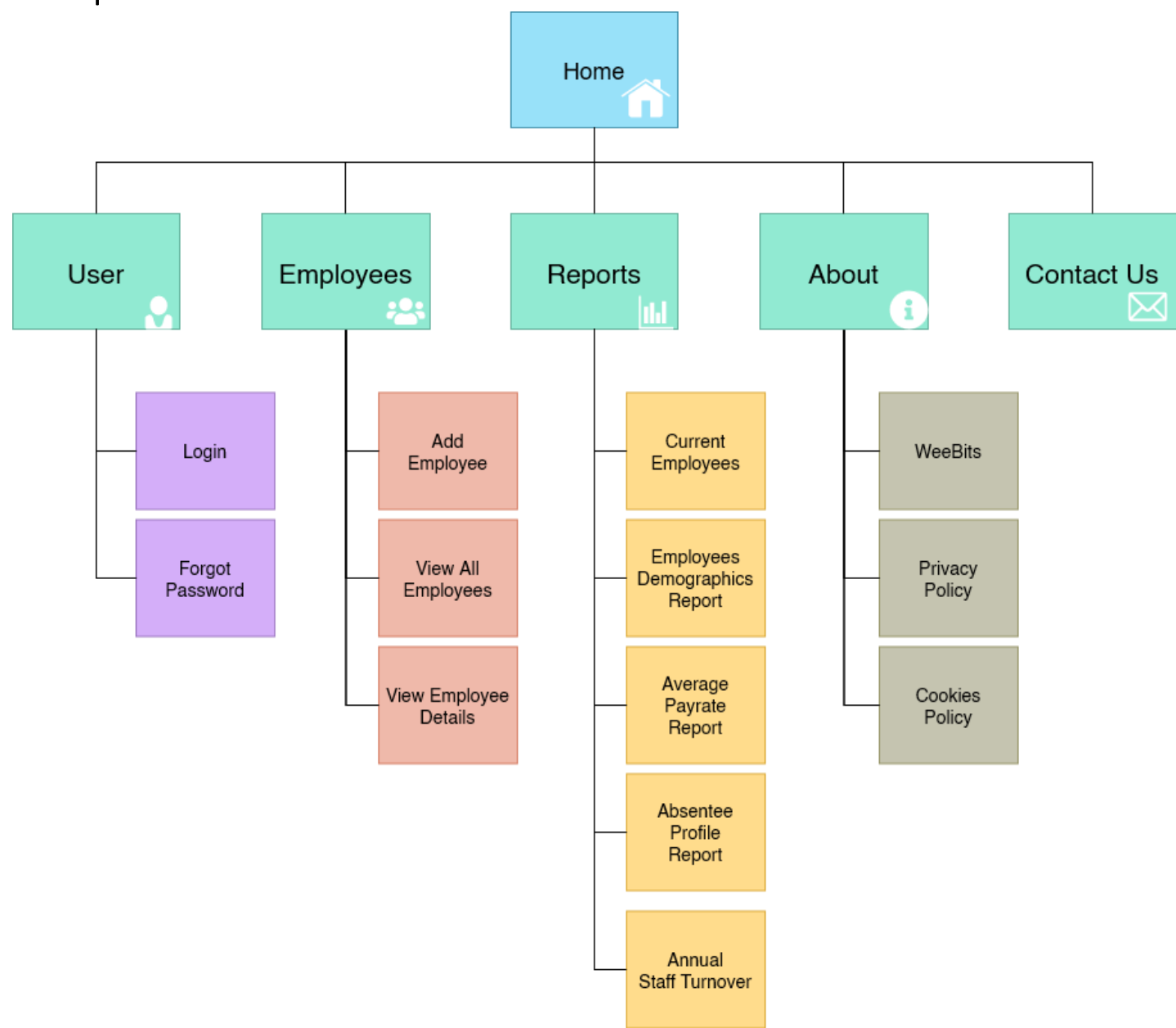


Figure 19: Human Resource System Sitemap

Appendix 2 – User Stories


Table 4: Human Resource System User Stories

Human Resource System User Stories					
#	Theme	Role (As a...)	Action (I want...)	Goal (So that I can...)	
HR.US001	Login System	Manager	to have a unique username	log into the system	✓
HR.US002		Manager	to have a password	log into the system	✓
HR.US003		Manager	to have a secure login screen with username and password fields	enter my unique login credential	✓
HR.US003		Manager	a button on the secure login screen	submit credentials and access restricted content	✓
HR.US004			to have the ability to log out of the system	end my session and prevent system misuse	✓
HR.US005		Manager	the human resource system to be role restricted	prevent unauthorised access	✓
HR.US005		Manager	to access human resource system after successful login	manage employee data and generate reports	✓
HR.US006	Employee Management	Manager	to have an add employee screen with input fields	enter information for a new employee	✓
HR.US007		Manager	a button on the add employee screen	submit the employee data and add as a new staff member	✓
HR.US008		Manager	to view a list of all current employees	get an overview of currently employed staff	✓

Human Resource System User Stories					
#	Theme	Role (As a...)	Action (I want...)	Goal (So that I can...)	
HR.US009		Manager	to print a list of all current employees	produce a hardcopy of the employee list	✓
HR.US010		Manager	to view a list of current employees for a region	access staff information related to a region	✓
HR.US011		Manager	to print a list of current employees for a region	produce a hardcopy of the region employee list	✓
HR.US012	Reports Management	Manager	to view number of employees filtered by age	generate employee demographics report	✓
HR.US013		Manager	to print number of employees filtered by age	produce a hardcopy of age group report	✓
HR.US014		Manager	to view number of employees filtered by gender	generate employee demographics report	✓
HR.US015		Manager	to print number of employees filtered by gender	produce a hardcopy of gender report	✓
HR.US016		Manager	to view average rates of pay by role	compare average payrates across the roles	✓
HR.US017		Manager	to print average rates of pay by role	produce a hardcopy of role payrates report	✓
HR.US018		Manager	to view average rates of pay by gender	compare average payrates across genders	✓
HR.US019		Manager	to print average rates of pay by gender	produce a hardcopy of gender payrates report	✓

Human Resource System User Stories					
#	Theme	Role (As a...)	Action (I want...)	Goal (So that I can...)	
HR.US020		Manager	to see absentee profile by job category	review absences across different job categories	<input checked="" type="checkbox"/>
HR.US021		Manager	to view annual staff turnover ratio for the whole company	monitor company-wide employee satisfaction	<input checked="" type="checkbox"/>
HR.US022		Manager	to print annual staff turnover ratio for the whole company	produce a hardcopy of the staff turnover report	<input checked="" type="checkbox"/>
HR.US023		Manager	to view annual staff turnover ratio by region	monitor employee satisfaction for a region	<input checked="" type="checkbox"/>
HR.US024		Manager	to print annual staff turnover ratio by region	produce a hardcopy of the staff turnover report	<input checked="" type="checkbox"/>

Appendix 3 – Microservice Architecture

 **Swagger**
Supported by SMARTBEAR

Select a definition

WeeBitsAPI v1

WeeBits HR Microservice v1 OAS3

<https://weebitsapi.azurewebsites.net/swagger/v1/swagger.json>

Employees

API endpoints for employee management

GET

/employees

Return all WeeBits employees

GET

/employees/{employee_email}

Return details of an employee

POST

/employees/create

Add a new employee

Reports

API endpoints for report management

GET

/reports/current-employees

Return all current employees

GET

/reports/employees-demographics

Return employees demographics report

GET

/reports/average-payrate

Return employees payrate report

GET

/reports/absentee-profile

Return employees absentee profile

GET

/reports/annual-staff-turnover

Return annual staff turnover rate

Figure 20: HR microservice API endpoints

GET

/employees/{employee_email} Return details of an employee

Return an employee with associated Branch, Job and Absences objects belong to the unique employee_email paramater provided.

Parameters

Try it out

Name	Description
employee_email * required string (path)	Employee's unique employee_email address e.g. bobby@weebits.co.uk. <div>employee_email</div>

Responses

Code	Description	Links
200	Success	No links
404	Not Found	No links

Media type

text/plain

Example Value | Schema

```
{
  "type": "string",
  "title": "string",
  "status": 0,
  "detail": "string",
  "instance": "string",
  "additionalProp1": "string",
  "additionalProp2": "string",
  "additionalProp3": "string"
}
```

Figure 21: Sample microservice endpoint testing interface (Employee Details)

Appendix 4 – Object Schema



Figure 22: Microservice object schema (from Swagger)

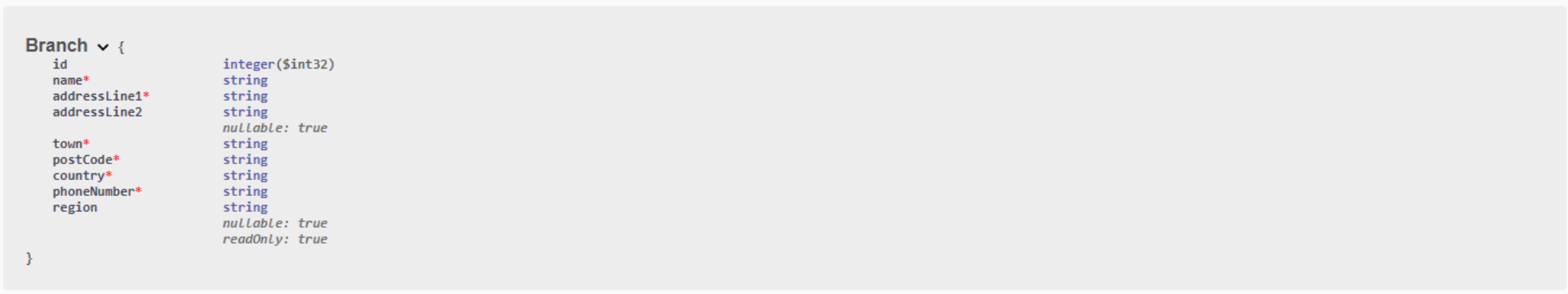


Figure 23: Sample object schema (Branch)

Appendix 5 – Prototype Screens

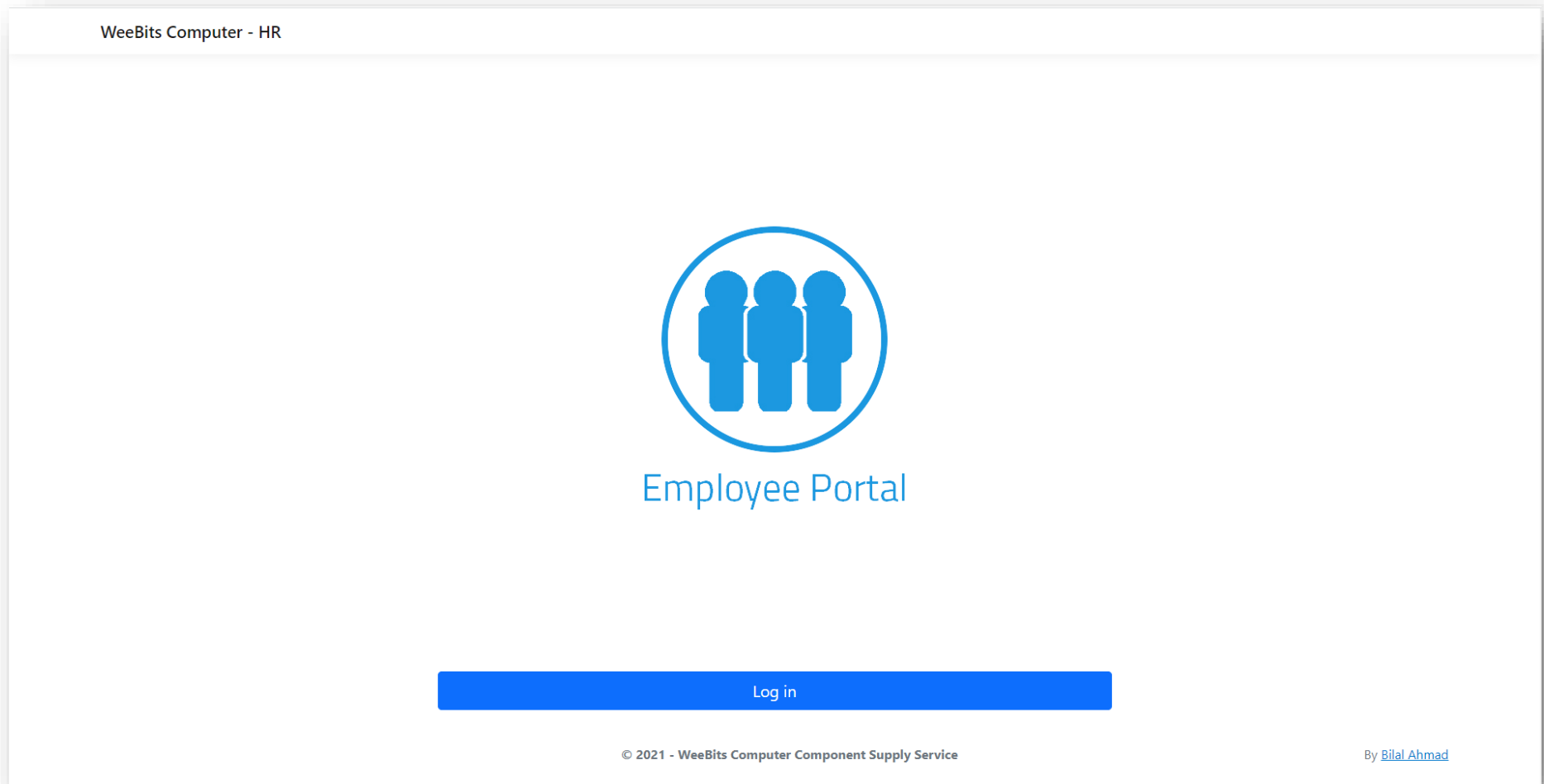


Figure 24: Home Screen

Log in

☐ Remember me?

Log in

[Forgot your password?](#)

Figure 25: Login screen

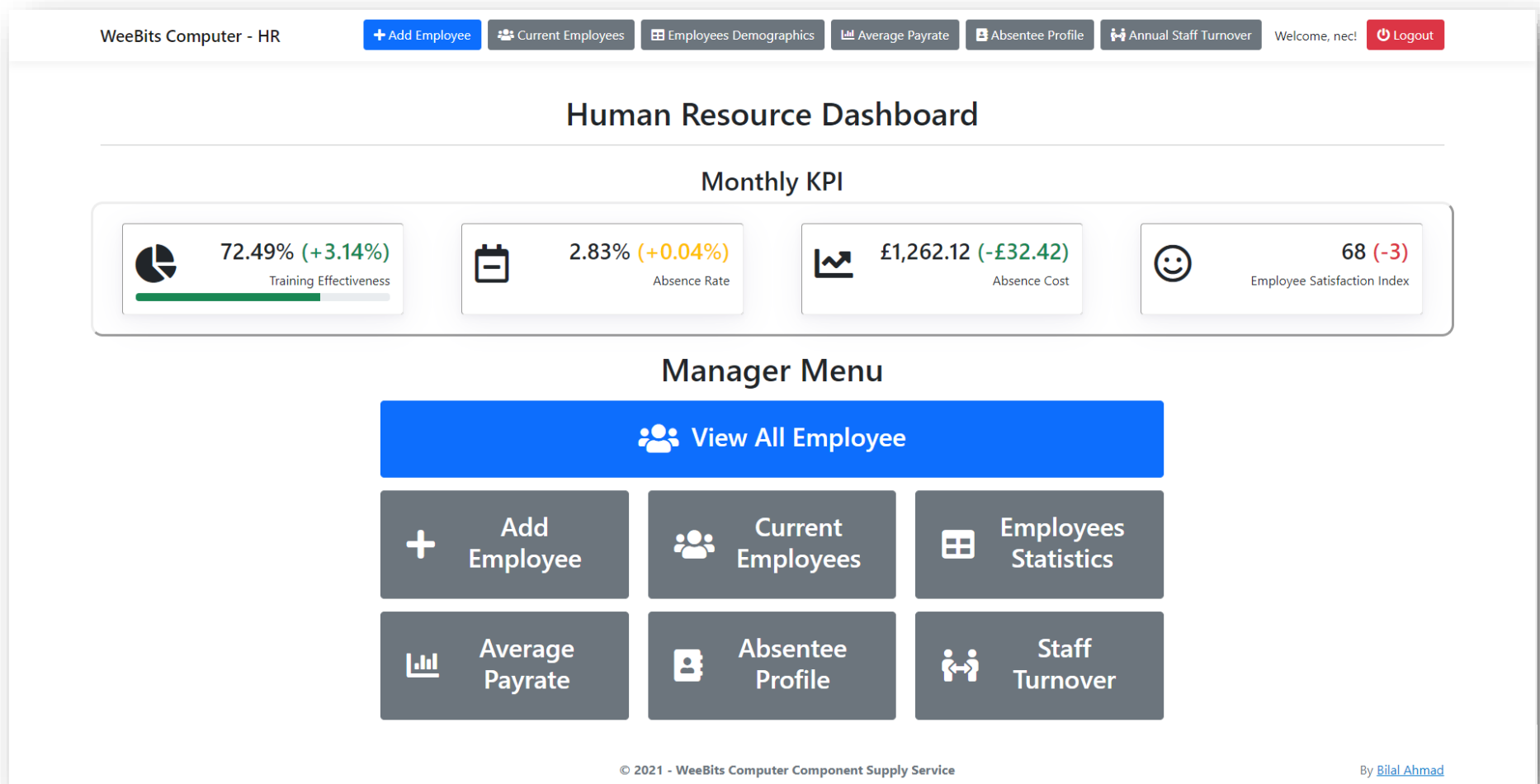


Figure 26: Manager dashboard

Town

Post Code

Country

Phone Number

Payroll Number

Position

Salary

Date of Birth
dd/mm/yyyy

December 2005

↑

↓

Mo	Tu	We	Th	Fr	Sa	Su
28	29	30	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	1
2	3	4	5	6	7	8

ClearToday

Back to Employee List

Add Employee

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By [Bilal Ahmad](#)

Figure 27: Add employee screen

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All Current WeeBits Employees

[+ Add Employee](#)

Show 10 entries

[Copy Data](#)[Export to Excel](#)[Print/Export to PDF](#)[Select Columns](#)Search:

Name	Email	Phone No.	Payroll	Active	Position	Salary	DOB	Gender	Join	Leave	Job Cat	Branch	
NEC UK	nec@weebits.co.uk	01442768445	H8473	✓	Senior Developer	£50,000.00	01/01/1970	Female	01/01/2000		IT	NC Branch, UK	Details
George Dunlop	george@weebits.co.uk	0789796234	G5673	✓	Lead Software Developer	£48,500.00	01/01/1994	Male	01/01/2017		IT	Glasgow Branch, UK	Details
just joined	just@weebits.co.uk	0329487	P4563	✓	aksjd	£19,000.00	17/05/2001	Other	21/10/2010		Sales	Le Harve Branch, France	Details
Latest Employee	latest@weebits.co.uk	0385973433	L23486	✓	Helper	£21,000.00	29/11/2005	Male	29/11/2020		Warehouse	Manc Branch, UK	Details
Newcastle Employee	newcastle@weebits.co.uk	07823479	N4673	✓	International Sales	£31,500.00	01/01/1967	Other	01/01/2000		Sales	NC Branch, UK	Details
A Person	prof@weebits.co.uk	07777777777	G50813	✓	Sales	£18,000.00	16/03/2005	Other	10/11/2021		Customer Service	Glasgow Branch, UK	Details
B A	leaver@weebits.co.uk	0759823469	1990813	✓	IT Manager	£43,723.00	17/11/2021	Male	17/11/2013		IT	Calais Branch, France	Details
Internet Marketing	internetmarketing@weebits.co.uk	04798310635	1990811	✓	Internet Marketing	£22,500.00	11/06/2003	Other	06/03/2020		Marketing	Glasgow Branch, UK	Details
Samantha M	samantha@weebits.co.uk	+4479874310635	P1475813	✓	Client Manager	£35,000.00	01/01/2000	Female	28/05/2019		Sales	NC Branch, UK	Details

Figure 28: Current employees screen

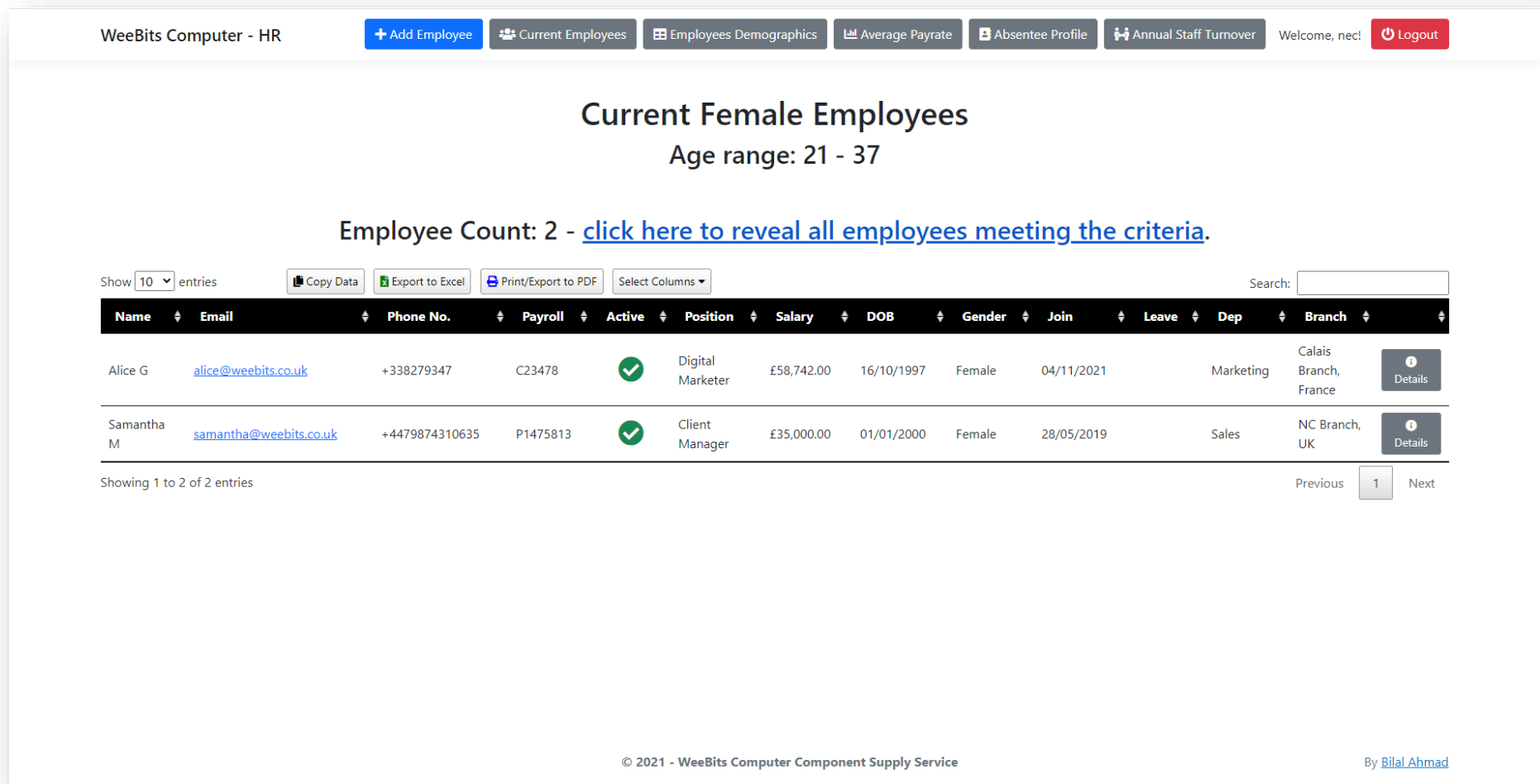


Figure 29: Employees demographics report

Average Payrate Reports

Average Payrate by Gender

Show 10 entries

[Copy Data](#)[Export to Excel](#)[Print/Export to PDF](#)[Select Columns](#)Search:

Gender	Average Payrate (GBP)	Total Employees
Male	37782.86	7
Female	47914.00	3
Other	22750.00	4

Showing 1 to 3 of 3 entries

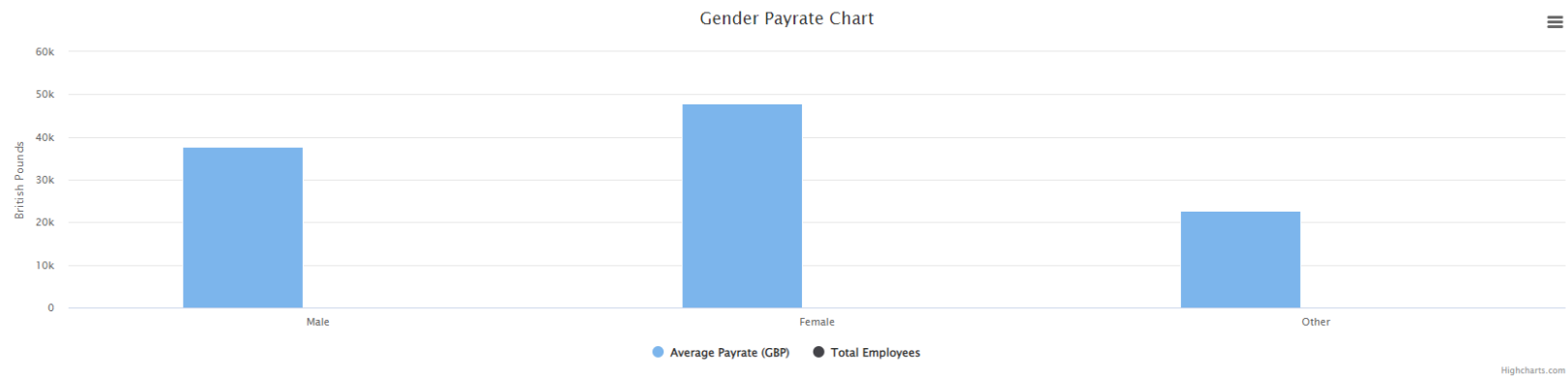
[Previous](#) [1](#) [Next](#)

Figure 30: Average payrate by gender report

Average Payrate by Role

Show 10 entries

Copy Data

Export to Excel

Print/Export to PDF

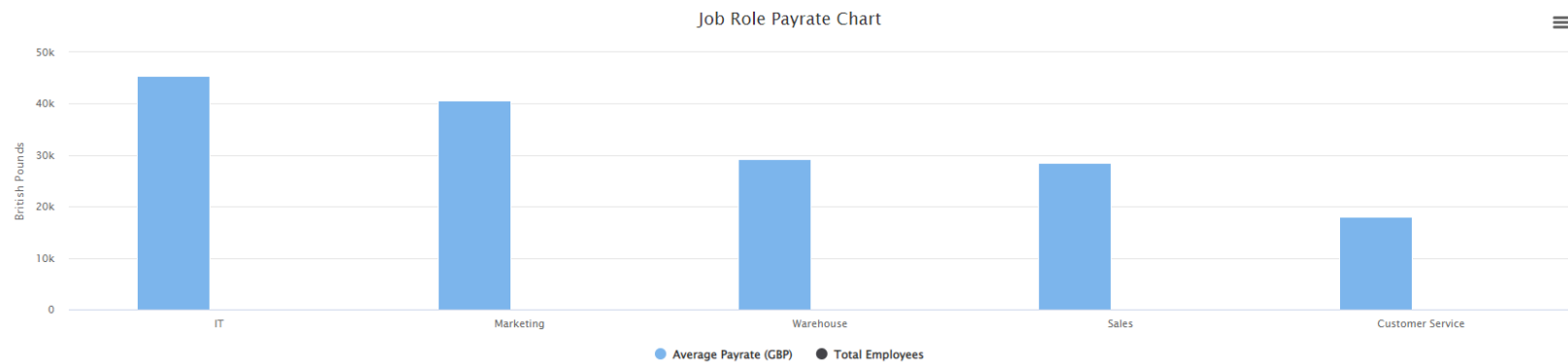
Select Columns

Search:

Job Role	Average Payrate (GBP)	Total Employees
IT	45348.60	5
Marketing	40621.00	2
Warehouse	29245.67	3
Sales	28500.00	3
Customer Service	18000.00	1

Showing 1 to 5 of 5 entries

Previous 1 Next



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By [Bilal Ahmad](#)

Figure 31: Average payrate by role report

Absentee Profile by Job Category

1/1/2021 - 7/7/2021

Show 10 entries

Copy Data

Export to Excel

Print/Export to PDF

Select Columns

Search:

Job Category	Average Hours of Absence	Total Employees
Marketing		2
IT	10	5
Warehouse		3
Sales		3
Customer Service		1

Showing 1 to 5 of 5 entries

Previous 1 Next

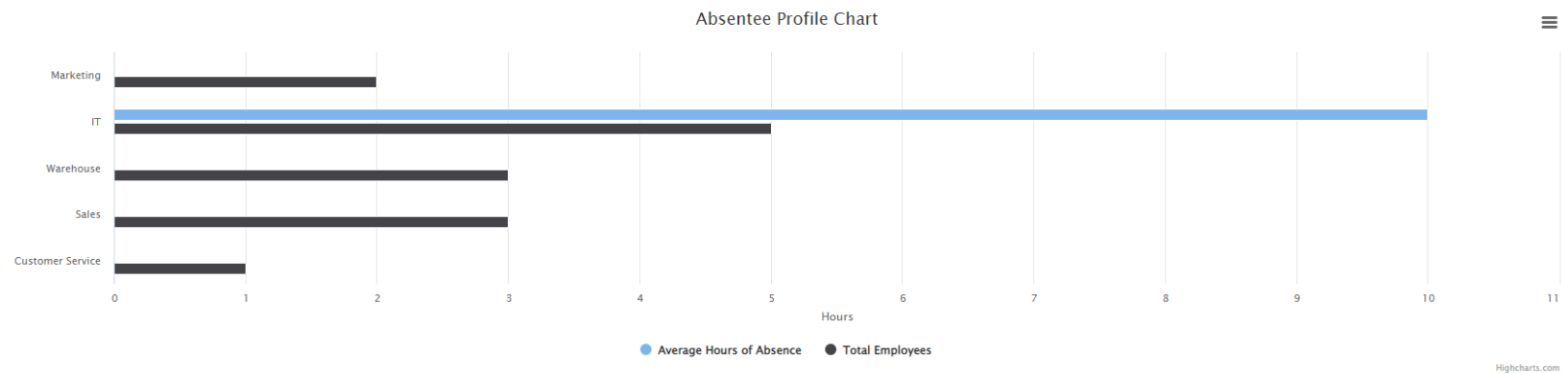


Figure 32: Absentee profile by job category report

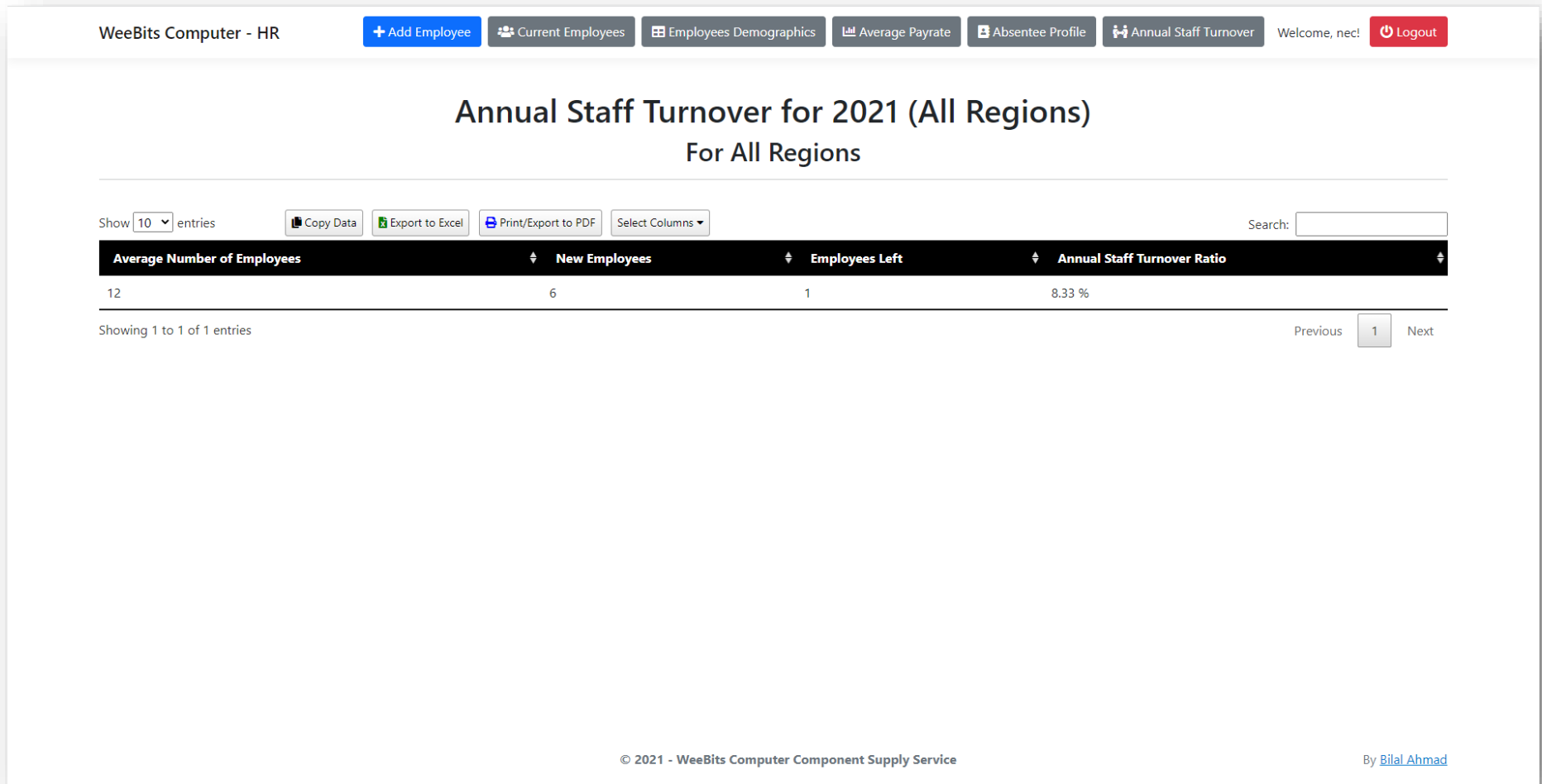


Figure 33: Annual staff turnover report



Figure 34: Sample print report