

IT Asset Tacking – Design Document

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Overview

The IT Asset Tracking Project is a multi project solution to manage hardware and software assets, assigning them to employees or departments as well as keeping track of IT support tickets and reading various statistics data like asset values, license usage, ticket resolution times and more.

Context

This project should provide options for managing and tracking assets, support tickets and reading various reports.

The project should provide an Interface that is easy to navigate and easy understand created with ASP.Net MVC. It also provides a complete API that allows for implementation of an external front end.

Both interface and API should have proper Security in Place.

Solution

The Solution consist of multiple projects:

- Core Layer 2
- Data Layer 2
 - ERD 3
- Application Layer 4
- Testing Layer 4
- Model View Controller 5
- Rest API21

Security27
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Core Layer

Contains interfaces, models and entities that are shared across the solution

Data Layer

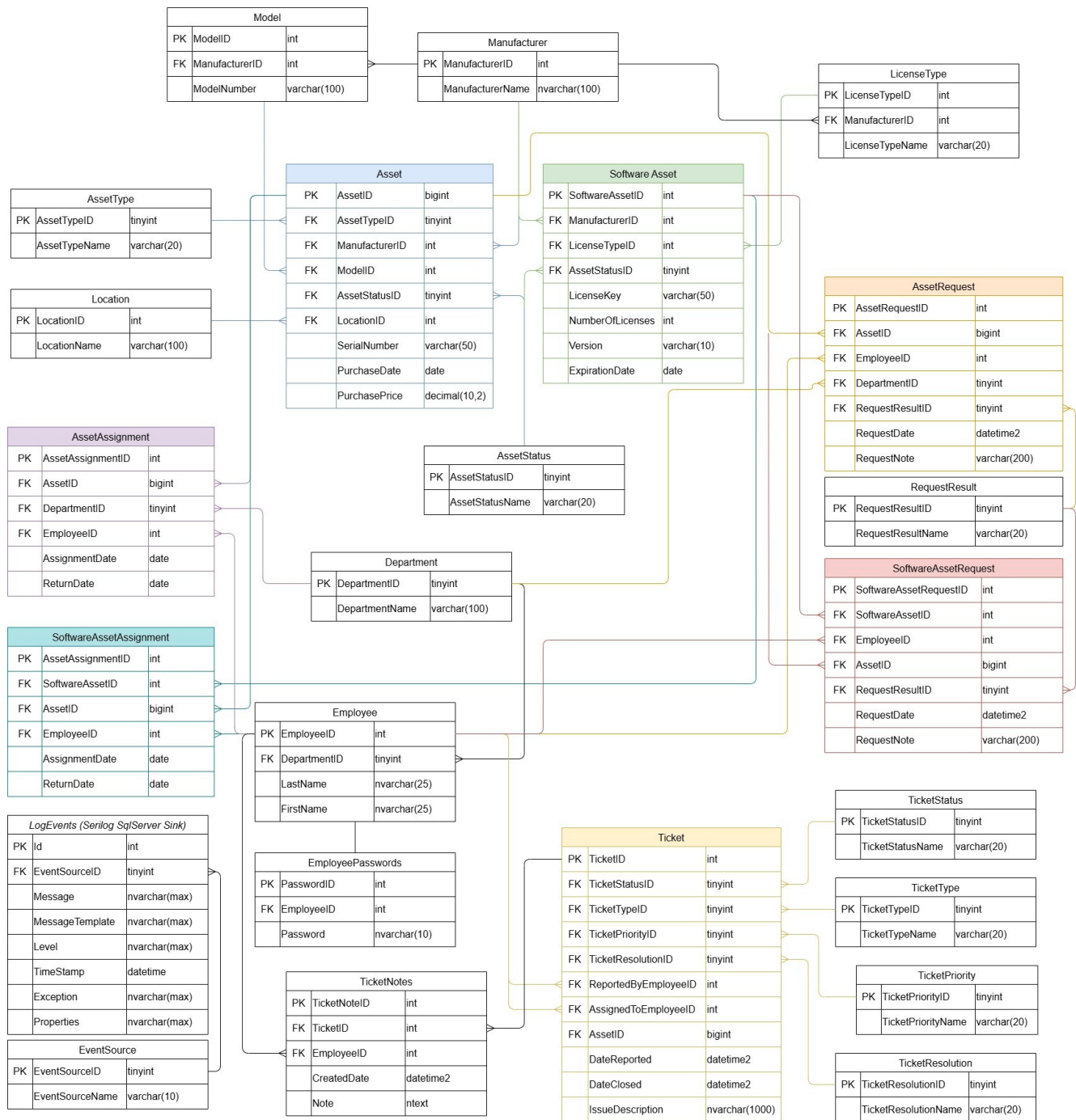
Connects to the Database for adding, retrieving, updating and deleting data.

I choose Entity Framework to query the DB as I expect to write A LOT of queries. A full ORM like EF will speed up creating and updating the repositories for the Data Layer. Also this project represents an application for a possibly large company where other choices like Dapper, as a third party package, could potentially be unreliable.

I made necessary adjustments to the provided ERD to meet the project's requirements.

Tech:

- SqlServer Database
- Entity Framework



IT Asset Tracking Project - ERD

Application Layer

Contains testable business logic between the Data Layer and MVC / API Layer.

The application class methods return “result” types:

```
{  
    Ok: bool,  
    Data?: <T>,  
    message: string,  
    Ex?: Exception  
}
```

which are consumed by the API and MVC Layer.

That way data and errors are being passed to the upper layers where they are handled properly.

Testing Layer

Contains unit tests for any testable logic of the Application Layer

Tech:

- Nunit
- Microsoft Test Sdk

Model View Controller

Here the interface of the web application will be created using MVC workflow and Razor syntax.

Users need to authenticate via Username and Password to view any of the sites content.

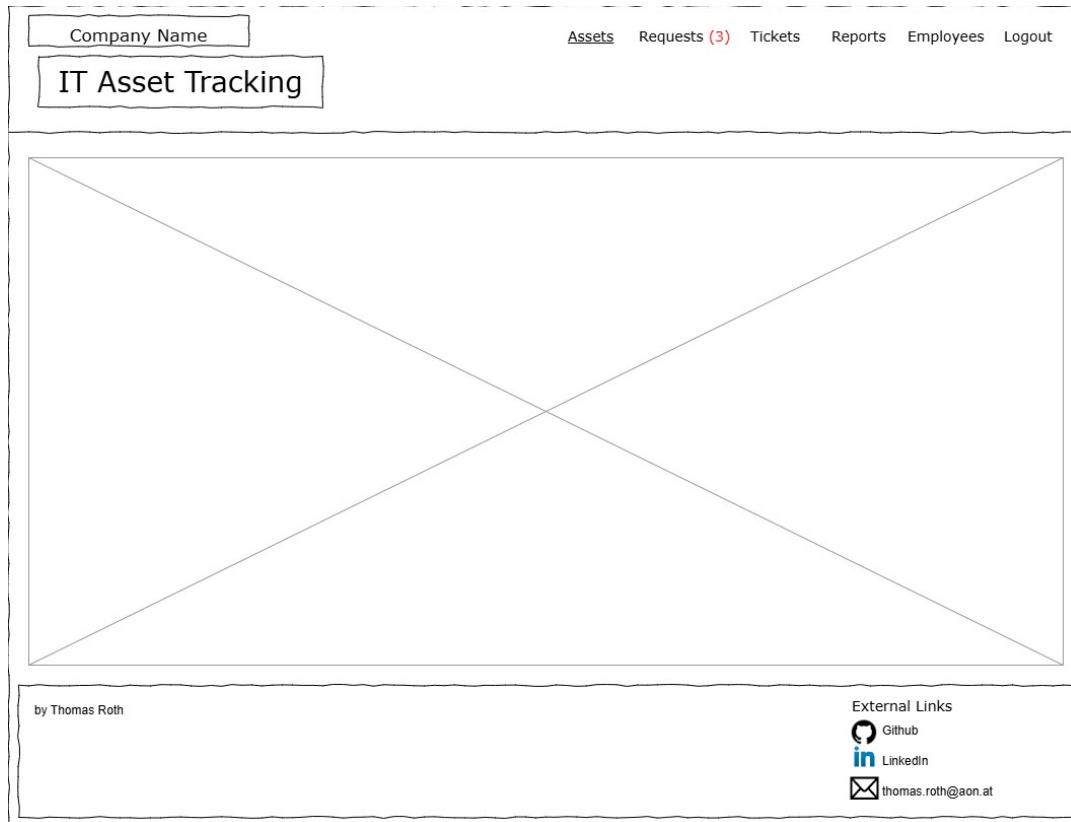
Users can have one of the following roles assigned to them:

- **Admin:** Access to all sites content and functionalities, can add or update users
- **Asset Manager:** Can add, edit and delete assets, assign assets, generate asset reports.
- **Software License Manager:** Manages software assets and their assignment, generate software compliance reports
- **Help Desk Technician:** Manage support tickets. Creating, updating, assigning and adding notes to tickets.
- **Department Manager:** View assets assigned to their department, request new assets or reassignments, view ticket status for their department's assets
- **Employee:** View and create support tickets for their assigned assets.
- **Auditor:** Read-Only access to all asset and ticket information, generate and view any reports.

For the styling I will leverage **bootstrap** for responsive design.

The following pages will showcase the interface wireframes.

The header and footer are static while the main section is dynamic.



The Header contains links to the main sections of the Service.

- **Assets** => leads to the Assets Index Page
- **Requests** => Shows the number of open asset requests. Leads to the asset request page accessible to *Asset Managers* and *Admins* and *read-only access for Department Managers*.
- **Tickets** => Accessible to *Help Desk Technicians*. Leads to the Tickets Index Page
- **Reports** => Accessible to *Auditors*. Leads to the Reports Index Page
- **Employees** => Accessible to Admins only. Leads to Employee List.

The following wireframes represent the main section for each path.

The **Assets Index** Page simply contains three links.

“My Assets”, “Department Assets”, “All Assets“

companyitassets/employee/23/assets			
Assets assigned to Doe, John			
Assets			
Model	Type	Status	
CR-123	Card Reader	Repair	Details
G83-6105	Keyboard	In Use	Details
GZ-2	Stationary Phone	In Use	Details
MSBOM	Mouse	In Use	Details
SE2422HX	Monitor	In Use	Details
Wacom K100986	Graphic Display	In Use	Details
Software Licenses			
License	Version	Status	
Zbrush	2025.1.1	In Use	Details

The ‘**My Assets**’ link redirects to a list of assets assigned to the currently logged in user. The list is ordered alphabetically by Model. As this should be a fairly short list of assets I choose to not implement a filter form here to avoid unnecessary cluttering.

The ‘**Department Assets**’ link redirects to the page shown below. This page is accessible to **department managers, asset managers and admins** and shows all assets assigned to the selected department. For department managers the ‘*Department Dropdown*’ is greyed out and defaults to the department of the currently logged in user.

companyitassets/assets/department/2/hardware

Department

Dep. 1B

Order

Status

Type

Any

Manufacturer

Any

Status

Any

Search

Apply

Hardware Assets

Software Assets

Request New Asset

Dep. 1B Assets

Serial Nr.	Model	Type	Manufacturer	Status	
DM-1B-01	SE2422HX	Monitor	Dell	In Use	Details
DM-1B-02	SE2422HX	Monitor	Dell	In Use	Details
MS-1B-02	MSBOM	Mouse	Microsoft	In Use	Details
KB-1B-01	G83-6105	Keyboard	Cherry	In Use	Details
KB-1B-01	G83-6105	Keyboard	Cherry	In Use	Details
DM-1B-01	SE2422HX	Monitor	Dell	In Use	Details
DM-1B-02	SE2422HX	Monitor	Dell	In Use	Details
KB-1B-01	G83-6105	Keyboard	Cherry	In Use	Details
KB-1B-08	G83-6105	Keyboard	Cherry	Repair	Details
KB-1B-01	G83-6105	Keyboard	Cherry	Repair	Details
MS-1B-01	MSBOM	Mouse	Microsoft	Storage	Details

The 'Request New Asset' button redirects to a list of available or unassigned assets.

companyitassets/assets/department/2/request		
Type	Any ▼	Apply
Keyboard		
Model	Manufacturer	
DC 2000	Cherry	Request
KC 600 SLIM	Cherry	Request
Monitor		
Model	Manufacturer	
EK241YH	Acer	Request
SE2422HX	Dell	Request
ODYS XP 32 PRO	Dell	Request
Printer		
Model	Manufacturer	
MFC-L8690CDW	Brother	Request
Laser Jet Pro MFP 4102fdw	HP	Request

Clicking the Request Link will then redirect to a list of employees of the current department where optionally an employee to assign the requested asset to can be selected.

The 'All Aseets' link redirects to a Filter Page first, then to the Assets Index Page which is accessible to Asset Managers and Admins. Here all company assets are shown.

companyitassets/assets/filter

View Assets

Type

Any

Manufacturer

Any

Location

Any

Status

Any

Go

Go Back

companyitassets/assets/hardware

Order

Location

Type

Any

Manufacturer

Any

Status

Any

Location

Any

☒ View Retired

Search

Apply

Hardware Assets

Software Assets

Add

Serial Nr.	Model	Type	Manufacturer	Status	Location	
DM-3B-01	SE2422HX	Monitor	Dell	In Use	Vienna	Details
DM-3B-02	SE2422HX	Monitor	Dell	In Use	Vienna	Details
MS-3B-02	MSBOM	Mouse	Microsoft	In Use	Vienna	Details
KB-3B-01	G83-6105	Keyboard	Cherry	In Use	Vienna	Details
KB-3B-01	G83-6105	Keyboard	Cherry	In Use	Vienna	Details
DM-4A-01	SE2422HX	Monitor	Dell	In Use	Vienna	Details
DM-4A-02	SE2422HX	Monitor	Dell	In Use	Vienna	Details
KB-4A-01	G83-6105	Keyboard	Cherry	In Use	Vienna	Details
KB-IT-08	G83-6105	Keyboard	Cherry	Retired	Vienna	Details
KB-4A-01	G83-6105	Keyboard	Cherry	Repair	Vienna	Details
MS-3B-01	MSBOM	Mouse	Microsoft	Storage	Vienna	Details

Clicking the ‘Add’ button will first redirect to a list of manufacturers to choose from and then to the ‘Add Asset’ form.

companyitassets/assets/addmanufacturer

Select Manufacturer

Go Back

Continue

(without Manufacturer)

Add...

Search

Apple	Select
Cherry	Select
Dell	Select
Microsoft	Select
...	
...	
...	
...	

companyitassets/assets/add

Add Asset

Manufacturer

Dell

Model

None

Asset Type

- SELECT -

Serial Number

Purchase Date

02-02-2025

Defaults to Today

Purchase Price

Save

Go Back

companyitassets/assets/hardware/25

Asset Details

Model Nr.
SE2422HX

Asset Type

Monitor

Manufacturer

Dell

Status

In Use

Location

Vienna

Purchase Date

21-03-2022

Purchase Price

\$85,99

Serial Nr.
DM-2A-4

Edit

Go Back

Delete

Assign to employee

Assign to department

Return asset

Request reassignmnet

Support Ticket

Assignment History

Department	Employee	Assignment Date	Return Date
Dep. 2A	Doe, John	03-01-2025	
Dep. 1B	Smith, Jane	12-06-2024	18-12-2024

Support History

Status	Type	Priority	Technician	Report Date
Completed	Maintenance	Medium	Smith, Jane	05-01-2025

The Asset Details page shows various information of the selected asset including an assignment and support ticket history.

This page allows for various actions depending on the user's role

Employees and Help Desk Technicians: Can create a support ticket

Asset Manager and Admin: Access to all options displayed in the Wireframe

Software License Manager: Access to all options displayed in the Wireframe (for software assets)

Department Manager: Can request an asset reassignment

The 'Edit' button leads to the Edit form which is similar to the 'Add Asset' form.

The 'Delete' button will redirect to a confirmation page before deleting the asset.

Assigning assets to employees or department can be done in two ways.

1. From the Asset Details Page:

companyitassets/assets/hardware/assignemployee/25

Assign to Employee

Go Back

Starts with

Any

 Default 'A' Department

Any

Search

Apply

Employee	Department	
Doe, Jane	Dep. 1A	Assign
Doe, John	Dep. 1A	Assign
Smith, Emily	Dep. 1A	Assign
Testerburger, Wendy	Dep. 1A	Assign
...		
...		
...		
...		
...		

‘Assign to Employee’ will show a list of employees to choose from. The DepartmentID will be set to the chosen employees assigned department.

‘Assign to Department’ will instead show a list of Departments to choose from.

2. From an Asset Request

Asset Managers can access the header’s *Requests* link.

companyitassets/requests

Hardware Assets

Software Assets

Model	Type	Department	Employee	Request Date		
MFC-L8690CDW	Printer	Dep. 2A		05-02-2025	Assign	Deny
DC 2000	Keyboard	Dep. 3B	Doe, John	01-02-2025	Assign	Deny

companyitassets/requests/assign

Confirm Asset Assignment

Serial Nr.: KB-4A-03

Model: DC 2000

Type: Keyboard

Assign to:

Department: Dep. 3B

Employee: Doe, John

Add Note:

Confirm

Go Back

If the request is instead denied the confirmation page will be almost identical with red coloration instead.

From the Asset Details page you can also create a **new support ticket**

companyitassets/tickets/add

New Support Ticket

Asset
KB-1A-03

Reported By
Doe, John

Issue Description

Type
- SELECT -

Priority
Medium

Save

Go Back

Ticket Status and Resolution default to "Open".
Technical Employee is being assigned in the "Ticket Details" page.
Reporting Employee defaults to the logged in user

After hitting the save button, the user is being redirected to the details page of the new ticket, where reporting and assigned employee can be changed with proper authorization.

companyitassets/tickets/123

Ticket Details

Edit

Go Back

Status	Resolution	Type	Priority	Report Date	Closed Date
Closed	Completed	Issue	Medium	25-01-2025	03-02-2025

Asset Information

Asset Type
Monitor

Model Nr.
SE2422HX

Serial Nr.
DM-3B-01

Location
Vienna

Reported By
Doe, John

Change

Assigned Technician
Jameson, James

Re/Assign

Issue Description:
Monitor doesn't turn on anymore after Employee violently punched it with their fist because "I deleted a comment and suddenly the code wouldn't compile anymore".

Notes

Add Note

Note	Employee	Date	
Replacement parts arrived. Starting repair tomorrow.	Jameson, James	29-01-2025	Edit Delete
Replacement parts ordered	Jameson, James	26-01-2025	Edit Delete

The 'Tickets' link in the header redirects to the tickets index page.

companyitassets/tickets/

c

Order

Report Date Desc. ▾

Status

Any ▾


Type

Any ▾

Priority

Any ▾

☐ Only Unassigned

Search 

Apply

Tickets Overview

Add

Asset	Status	Type	Priority	Report D.	
DM-3B-01	Open	Issue	High	03-02-2025	Details
DM-3B-02	Open	Issue	High	03-02-2025	Details
MS-3B-02	In Progress	Maintenance	Medium	03-02-2025	Details
KB-3B-01	Open	Maintenance	Critical	02-02-2025	Details
KB-3B-01	In Progress	Request	Low	02-02-2025	Details
DM-4A-01	In Progress	Maintenance	Medium	01-02-2025	Details
DM-4A-02	Closed	Issue	Critical	01-02-2025	Details
KB-4A-01	Closed	Other	Low	01-02-2025	Details
KB-IT-08	Closed	Issue	High	31-01-2025	Details
KB-4A-01	Closed	Maintenance	Medium	31-01-2025	Details
MS-3B-01	Closed	Maintenance	Low	31-01-2025	Details

Tickets that are not assigned to a technician are displayed with a light red background.

Here clicking the “Add” button will simply redirect to the Assets Index Page where an asset can be searched for and a new ticket can be created via the asset’s details page.

Changing the assigned technician or reporting employee redirects to employee select page which is similar to the employee assign page shown in the asset assignment section above.

Users with the *Department Manager* Role also have read-only access to the Tickets page. However only tickets for assets assigned to their department will be shown.

Lastly and Auditor can create various **reports** from 'Reports' link in the header.
 Asset Managers can create Hardware Asset Reports and Software License Managers can create Software Compliance reports

The reports index page will feature a simple interface where the user has multiple options to choose from:

- Hardware Assets Reports
 - Distribution
 - Status
 - Value
- Software Assets Reports
 - Distribution
 - Status
- Tickets

c
companyitassets/reports/hardwareassets/distribution

From
04-11-24

To
04-02-25

The default date values are from: today minus 3 months, to: today

Location
Any ▼

Department
Any ▼

Asset Type
Any ▼

Order
Asset Type ▼

Apply

The result set is ordered in:
 LOCATION
 - DEPARTMENT
 - Result Table

Vienna	
Dep. 1A	
Asset Type	Number of Assets
Card Reader	4
Laptop	5
Mobile Phone	3
Monitor	8
Mouse	8
Keyboard	8
PC	8
Printer	3
Stationary Telephone	3
Tablet	4
Dep. 1B	
Asset Type	Number of Assets
Card Reader	3

Example Hardware Distribution Reports

companyitassets/reports/hardwareassets/status

From

04-11-24

Location

Vienna

Asset Type

Any

To

04-02-25

Department

Dep 3B

Order

Asset Type

Apply

The default date values are from: today minus 3 months, to: today

Asset Type	Number of Assets	In Use	Storage	Repair
Card Reader	4	4	0	0
Laptop	5	4	0	1
Mobile Phone	3	3	0	0
Monitor	8	8	0	0
Mouse	8	6	2	0
Keyboard	9	8	1	0
PC	10	8	1	1
Printer	3	3	0	0
Stationary Telephone	3	3	0	0
Tablet	4	3	0	1

companyitassets/reports/hardwareassets/value

From

04-11-24

To

04-02-25

Order

Asset Type

Apply

The default date values are from: today minus 3 months, to: today

Total Asset Value

\$1.567.040,06

Asset Type	Number of Assets	Total Value per Type
Card Reader	61	\$1,234.56
Laptop	90	\$54,321.98
Mobile Phone	246	\$98,543.21
Monitor	417	\$83,456.78
Mouse	711	\$23,456.78
Keyboard	304	\$45,678.65
PC	378	\$567,890.12
Printer	235	\$234,567.89
Router	29	234.56
Server	16	\$321,654.87
Stationary Telephone	255	\$32,345.88
Tablet	430	\$121,543.67

The Date Filter for all reports defaults to: From: Today – 3 Months To: Today

Software assets reports follow a similar pattern:

companyitassets/reports/softwareassets/distribution

From

04-11-24

License Type

Any

Order

License Type

To

04-02-25

Department

Any

Apply

Dep. 1A

License Type	Licenses in use
3Ds Max	5
Adobe Photoshop	4
Adobe After Effects	5
Adobe Lightroom	3
Cinema 4D	3
Houdini	4
Maya	3
Realflow	3
VRay	2
Windows	34
ZBrush	4

Dep. 1B

License Type	Licenses in use
3Ds Max	4

For Ticket reports all information is in one page:

companyitassets/reports/tickets/

From

04-11-24

To

04-02-25

Ticket Type

Any

Apply

Resolutions

Ticket Type	Completed	Cancelled	User Error	Other
Maintenance	240	4	0	1
Issue	198	2	87	0
Request	62	0	0	3
Other	45	5	0	7

Admins can add or edit employee information and roles

The Employees Link in the header lead to the employees index page:

The screenshot shows a web interface for managing employees. The URL bar indicates the path is `companyitassets/employees`. On the left, there is a sidebar with filters: 'Order' (set to Department), 'Department' (set to Any), 'Role' (set to Any), 'Starts with:' (set to Any), and a search bar with the text 'Default 'A'' and a search icon. Below these filters is an 'Apply' button. To the right of the filters is a 'Register Employee' button. The main area contains a table with the following data:

Employee	Department	Role	
Doe, John	Dep. 1A	Employee	Edit
Doe, Jane	Dep. 1A	Employee	Edit
Smith, David	Dep. 1B	Asset Manager	Edit
...			
...			
...			
...			
...			
...			
...			
...			
...			

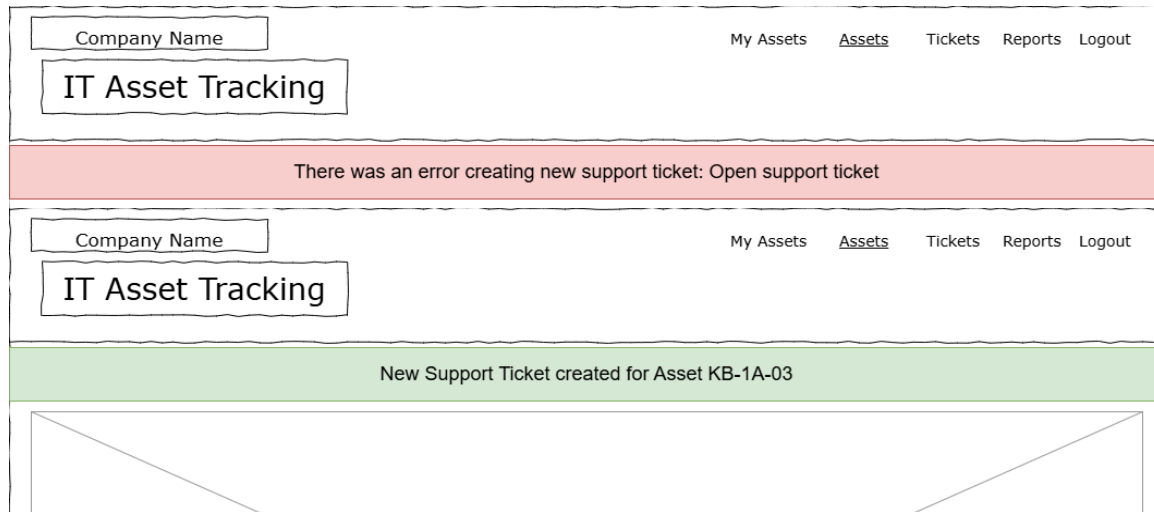
From here new Employees can be registered or existing ones edited

The screenshot shows a web interface for adding or editing employees. The URL bar indicates the path is `companyitassets/employees(add/edit)`. The page is titled 'New User'. On the left, there is a form with the following fields: 'First Name' (text input), 'Last Name' (text input), 'Department' (dropdown menu with 'Unassigned' selected), and 'Role' (dropdown menu with '- SELECT -' selected). Below the form are 'Save' and 'Go Back' buttons. On the right, there is a message: 'Only Admins can add or update users.' followed by a note: 'Usernames are generated as a combination of Last Name + First Name without whitespace, all lower case'. Below this is a note: 'Passwords are generated after the following pattern: ! + (Lastname) + (4 random numbers)'. An example is provided: 'Example: User with first name "John" and last name "Doe"'. The example shows the 'Username: "doejohn"' and the 'Password: !Doe5931'.

App Feedback and Error handling:

Error messages, as well as success or informational messages are displayed below the header.

Error messages are displayed with **red background and white text** while success or informational messages are displayed with **green background and white text**.



Error messages can be displayed for various reasons, like database connection errors, form invalidity, and database creating/updating/deleting errors.

Every success, information and error message is also being logged to the console.

Upon error the user is redirected to either the previous page, home page or form page where an error message, as described above will be displayed.

Rest API

CORS policies

If the environment is set to development the **AllowAllOrigins** policy is used. Which allows all origins as the name suggests.

In production, the app uses the **AllowedOrigins** policy which reads the allowed origins from the appsettings.json file.

Error Handling

Errors are being logged and controllers send an appropriate response of either 401 Unauthorized, 404 Not Found, 500 Internal Server Error etc.

The following pages contain a list of **endpoints**

API Endpoints

Assets Endpoints					
Endpoint	Route	Method	Roles	Response	Request Body
Get Assets	/assets	GET	<ul style="list-style-type: none"> Admin Asset Manager Auditor 	200(JSON), 401	
Get Department Assets	/assets/department/{departmentID}	GET	<ul style="list-style-type: none"> Admin Asset Manager Auditor Department Manager 	200(JSON), 401	
Get Employee Assets	/assets/employee/{employeeID}	GET	<ul style="list-style-type: none"> Admin Asset Manager Auditor All other roles** 	200(JSON), 401	
Get Single Asset	/assets/{assetID}	GET	<ul style="list-style-type: none"> Admin Asset Manager Auditor Department Manager* All other roles** 	200(JSON), 404, 401	
Get Available Assets	/assets/available	GET	<ul style="list-style-type: none"> Admin Asset Manager Auditor Department Manager 	200(JSON), 401	
Add Asset	/assets	POST	<ul style="list-style-type: none"> Admin Asset Manager 	201, 400, 401, 409	<pre>{ AssetTypeID: int ManufacturerID: int?*** ModelID: int? LocationID : int SerialNumber: string (maxL: 50) PurchaseDate: date PurchasePrice: decimal(10,2) }</pre>
Edit Asset	/assets/{assetID}	PUT	<ul style="list-style-type: none"> Admin Asset Manager 	204, 400, 404, 401	<pre>{ AssetTypeID: int ManufacturerID: int? ModelID: int? AssetStatusID: int LocationID : int SerialNumber: string (maxL: 50) PurchaseDate: date PurchasePrice: decimal(10,2) }</pre>
Delete Asset	/assets/{assetID}	DELETE	<ul style="list-style-type: none"> Admin Asset Manager 	204, 404, 401	

* Only if authorized Department Manager is assigned the same DepartmentID as the requested Asset, ** Only if Asset is Assigned to EmployeeID of the requesting Employee, *** ? = optional

Get Licenses	/licenses	GET	<ul style="list-style-type: none"> Admin Software License Manager Auditor 	200(JSON), 401	
Get Employee Licenses	/licenses/employee/{employeeID}	GET	<ul style="list-style-type: none"> Admin Software License Manager Auditor All other roles** 	200(JSON), 401, 404	
Get Single License	/licenses/{softwareAssetID}	GET	<ul style="list-style-type: none"> Admin Software License Manager Auditor Department Manager* All other roles** 	200(JSON), 404, 401	
Add License	/licenses	POST	<ul style="list-style-type: none"> Admin Software License Manager 	201, 400, 401	<pre>{ ManufacturerID: int LicenseTypeID: int LicenseKey: string (maxL: 50) NumberOfLicenses: int Version: string (maxL: 10) ExpirationDate: date }</pre>
Edit License	/licenses/{softwareAssetID}	PUT	<ul style="list-style-type: none"> Admin Software License Manager 	204, 400, 404, 401	<pre>{ ManufacturerID: int LicenseTypeID: int AssetStatusID: int LicenseKey: string (maxL: 50) NumberOfLicenses: int Version: string (maxL: 10) ExpirationDate: date }</pre>
Delete License	/licenses/{softwareAssetID}	DELETE	<ul style="list-style-type: none"> Admin Software License Manager 	204, 404, 401	

* Only if authorized Department Manager is assigned the same DepartmentID as the Employee the requested Asset is assigned to,

** Only if Asset is Assigned to EmployeeID of the requesting Employee

Asset Assignment Endpoints					
Endpoint	Route	Method	Roles	Response	Request Body
Get assignemt history for one asset	/assets/{assetID}/assignments	GET	<ul style="list-style-type: none"> Admin Asset Manager Auditor 	200(JSON), 404, 401	
Assign Asset	/assets/assignments/	POST	<ul style="list-style-type: none"> Admin Asset Manager 	201, 400, 401, 409	{ AssetID: int DepartmentID: int EmployeeID: int? }
Reassign Asset / Return Asset	/assets/assignments/{assetAssignmentID}	PUT	<ul style="list-style-type: none"> Admin Asset Manager 	204, 400, 401	{ AssetID: int DepartmentID: int EmployeeID: int? ReturnDate: date? }
Get assignemt history for one license	/licenses/{softwareAssetID}/assignments	GET	<ul style="list-style-type: none"> Admin Software License Manager Auditor 	200(JSON), 404, 401	
Assign License	/licenses/assignments/	POST	<ul style="list-style-type: none"> Admin Software License Manager 	201, 400, 401, 409	{ SoftwareAssetID AssetID: bigint? EmployeeID: int? }
Reassign License / Return License	/licenses/assignments/{assetAssignmentID}	PUT	<ul style="list-style-type: none"> Admin Software License Manager 	204, 400, 401	{ SoftwareAssetID: int AssetID: bigint? EmployeeID: int? ReturnDate: date? }
Asset Request Endpoints					
Get asset request history	/requests	GET	<ul style="list-style-type: none"> Admin Asset Manager Auditor 	200(JSON), 401	
Get open asset requests	/requests/open	GET	<ul style="list-style-type: none"> Admin Asset Manager Auditor 	200(JSON), 401	
Request asset assignment	/requests/assets	POST	<ul style="list-style-type: none"> Admin Department Manager 	201, 400, 401, 409	{ AssetID: int EmployeeID: int? DepartmentID: int }
Request license assignment	/requests/licenses	POST	<ul style="list-style-type: none"> Admin Department Manager 	201, 400, 401, 409	{ SoftwareAssetID: int EmployeeID: int? AssetID: int }
Update / Resolve asset request	/requests/assets/{AssetRequestID}	PUT	<ul style="list-style-type: none"> Admin Asset Manager 	204, 400, 401, 409	{ AssetID: int EmployeeID: int? DepartmentID: int RequestResultID: int? RequestNote: string? }
Update / Resolve license request	/requests/licenses/{SoftwareLicenseRequestID}	PUT	<ul style="list-style-type: none"> Admin Software License Manager 	204, 400, 401, 409	{ SoftwareAssetID: int EmployeeID: int? AssetID: int RequestResultID: int? RequestNote: string? }

Support Tickets Endpoints					
Endpoint	Route	Method	Roles	Response	Request Body
Get Ticket History	/tickets/?page=1	GET	<ul style="list-style-type: none"> Admin Help Desk Technician Auditor 	200 (JSON), 401	
Get unresolved Tickets	/tickets/open	GET	<ul style="list-style-type: none"> Admin Help Desk Technician Auditor 	200 (JSON), 401	
Get unassigned Tickets	/tickets/unassigned	GET	<ul style="list-style-type: none"> Admin Help Desk Technician Auditor 	200 (JSON), 401	
Get Ticket Details	/tickets/{TicketID}	GET	<ul style="list-style-type: none"> Admin Help Desk Technician Auditor 	200 (JSON), 401, 404	
Create Ticket	/tickets	POST	<ul style="list-style-type: none"> Admin Help Desk Technician Auditor Department Manager Employee 	201, 400, 401, 409	<pre>{ TicketTypeID: int TicketPriorityID: int AssetID: int ReportedByEmployeeID: int IssueDescription: string (maxL: 1000) }</pre>
Update Ticket	/tickets/{TicketID}	PUT	<ul style="list-style-type: none"> Admin Help Desk Technician 	204, 400, 401, 409	<pre>{ TicketStatusID: int TicketTypeID: int TicketPriorityID: int TicketResolutionID: int? AssignedToEmployeeID: int IssueDescription: string (maxL: 1000) }</pre>
Delete Ticket	/tickets/{TicketID}	DELETE	<ul style="list-style-type: none"> Admin 	204, 401, 404	
Get Ticket Notes	/tickets/{TicketID}/notes	GET	<ul style="list-style-type: none"> Admin Help Desk Technician Auditor 	200 (JSON), 401, 404	
Add Ticket Note	/tickets/{TicketID}/notes	POST	<ul style="list-style-type: none"> Admin Help Desk Technician 	201, 400, 401, 404	<pre>{ EmployeeID: int Note: string }</pre>
Edit Ticket Note	/tickets/{TicketID}/notes/{TicketNoteID}	PUT	<ul style="list-style-type: none"> Admin Help Desk Technician 	204, 400, 401, 404	<pre>{ TicketID: int EmployeeID: int Note: string }</pre>
Delete Ticket Note	/tickets/{TicketID}/notes/{TicketNoteID}	DELETE	<ul style="list-style-type: none"> Admin Help Desk Technician 	204, 401, 404	

Reports Endpoints					
Endpoint	Route	Method	Roles	Response	Request Body
Generate Asset Reports	/reports/assets	GET	<ul style="list-style-type: none"> Admin Auditor Asset Manager 	200 (JSON), 400, 404, 401	<pre>{ From: date? To: date? LocationID: int? AssetTypeID: int? DepartmentID: int? }</pre> as query params
Generate Software Reports	/reports/licenses	GET	<ul style="list-style-type: none"> Admin Auditor Software License Manager 	200 (JSON), 400, 404, 401	<pre>{ From: date? To: date? LicenseTypeID: int? DepartmentID: int? }</pre> as query params
Generate Ticket Reports	/reports/tickets	GET	<ul style="list-style-type: none"> Admin Auditor 	200 (JSON), 400, 404, 401	<pre>{ From: date? To: date? TicketTypeID: int? }</pre> as query params
User Management Endpoints					
Get all Employees	/employees	GET	<ul style="list-style-type: none"> Admin 	200 (JSON), 401	
Get Employee	/employees/{EmployeeID}	GET	<ul style="list-style-type: none"> Admin 	200 (JSON), 401	
Search Employees	/employees?search="string"	GET	<ul style="list-style-type: none"> Admin 	200 (JSON), 401	
Create Employee	/employees	POST	<ul style="list-style-type: none"> Admin 	201, 400, 401	<pre>{ FirstName: string LastName: string DepartmentID: int? Role: RoleID }</pre>
Update Employee	/employees/{EmployeeID}	PUT	<ul style="list-style-type: none"> Admin 	204, 400, 404, 401	<pre>{ FirstName: string LastName: string DepartmentID: int? Role: RoleID }</pre>
Authentication Endpoint					
Login	/login	POST		200 (bearer token), 401	<pre>{ Username: string Password: string }</pre>
Other Endpoint					
Get Locations	/locations	GET	<ul style="list-style-type: none"> Admin Department Manager Asset Manager Software License Manager Auditor Help Desk Technician 	200 (JSON), 401	
Get Departments	/departments	GET	<ul style="list-style-type: none"> Admin Department Manager Asset Manager Software License Manager Auditor Help Desk Technician 	200 (JSON), 401	

Security

The MVC and API will leverage **ASP Identity Entity Framework** to manage Accounts and Roles.

The Password requirements are:

- 8 characters minimal length
 - Passwords are generated => ! + Lastname + 4RandomNumbers (!Doe5278)
 - if the user's last name is less than three characters long the generated password will substitute with additional random numbers at the end.
- at least one upper case character
- at least one lower case character
- at least one digit or other symbol

As described in the MVC users are assigned one of the following roles

- **Admin:** Access to all sites content and functionalities, can add or update users
- **Asset Manager:** Can add, edit and delete assets, assign assets, generate asset reports.
- **Software License Manager:** Manages software assets and their assignment, generate software compliance reports
- **Help Desk Technician:** Manage support tickets. Creating, updating, assigning and adding notes to tickets.
- **Department Manager:** View assets assigned to their department, request new assets or reassignments, view ticket status for their department's assets
- **Employee:** View and create support tickets for their assigned assets.
- **Auditor:** Read-Only access to all asset and ticket information, generate and view any reports.

Only User with the Admin Role may assign roles to other users.

See MVC Layer and API Endpoints section for role restricted access.

Logging

The MVC and API, by default, log information level events and above to the console.

I use **Serilog** for logging with Console and MSSqlServer Sink

- Information Logs on Database changes like creating, updating or deleting data.
- Warning Logs for invalid or unauthorized http requests.
- Error Logs for caught exceptions.

The applications write logs to the console and optionally to the database.

Database Logging is configurable in the appsettings.json of each program within the “DbLogging” section:

```
"Logging": {
  "LogLevel": {
    "Default": "Information",
    "Microsoft.AspNetCore": "Warning"
  },
  "DbLogging": {
    "Enabled" : "true",
    "LogLevel" : "Warning"
  }
},
```

If “Enabled” is set to “true” the application writes events of the configured log level and above to the database.

The “LogLevel” can be set to:

- “Information”
- “Debug”
- “Warning”
- “Error”

The MVC and API write Logs to the “LogEvents” Table.