# Project Contract

# 1.Student Name: Arawn Davies

# **2.P-number: P2626517**

# **3.Programme: Computer Science BSc. Hons**

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# **5.Project Title: microCMDB, a C# Minimal Overhead Configuration Management Database with a focus on network interoperability**

# **6.Project Proposer: Arawn Davies**

# 7.Supervisor: Dr Francois Siewe

# 8.Introduction:

Configuration Management Databases are databases which are used to accurately create records and keep track of an organisation’s IT infrastructure. CMDBs are used widely across ITSM (Information Technology Service Management) teams. Every device or service on the network will have its own CI (Configuration Item). CMDBs are vital for service technicians to be able to access or update asset information stored in a centralised location that is accessed through a variety of methods. While most CMDBs are accessed via a web tool in a support environment, for this CMDB, access can be done in the field via a smartphone too.

# 9.Project Background:

During my placement year at Leicestershire County Council, I was made aware of the vast number of devices deployed on the council network, and how difficult a job it was to keep track of which devices are rolled out to whom, what the specifications were of said devices, and what various servers and infrastructure-supporting devices are on the network. As part of the Agile Development Team, we had frequent meetings with the Application Management Group because we needed the specifications of the machines our software and utilities were being deployed to.

Not having access to a CMDB where we could easily identify important aspects of the machines made our jobs very difficult, as deployment was much more time consuming, and there was significant overhead and back-and-forth communication which could have been made unnecessary had we rolled out a CMDB beforehand.

Towards the end of my placement, we were asked to come together to start designing and developing a CMDB that would be used to aid development and deployment in our team. Sadly, due to time, resource, and funding constraints (it would be a very small team effort, and only one & a half months left before the end of my placement), we decided against it as we had other tasks with higher priority. When I researched CMDBs further, I identified the advantages of having one that could be used on both a personal network with a few devices, or an enterprise business/’homelab’ network that could have many different networked devices.

As I personally have many machines of varying CPU architectures and a few Network-Attached Storage servers, I have needed a CMDB for a long time coming. I will also be making it expandable so I can record more information e.g., user credentials, file server addresses, DHCP reservations and port-forwarding rules.

# 10.Aims:

In this project, we aim to produce a configuration management database in C# that can be easily adapted, expanded upon, and scaled up with minimal overhead. The database will have support for multiple frontends such as a WinForms-based GUI client, an elegant ASP.NET Core web tool, and a powerful cross-platform command-line interface. The .NET-based frontend will allow the CMDB to be cross-platform and is supported by most operating systems and computers, allowing access from an even wider array of devices (smartphones, laptops, thin clients, etc). The command line interface will be used for terminal-based access with a simple CRUD syntax.

# 11.Objectives:

My overall objective for this project is to present a system and all documentation that it can be studied as a functioning system for deployment in a network, as well as proving an academic understanding of this system. The objectives which I have set which will allow me to provide work to the best of my ability include a literature review to investigate past development of CMDBs, benefits and disadvantages of deploying a CMDB in a business environment and researching how CMDBs help support ITSM providers. I will be then taking these findings and compiling a report on how I took these findings to make the system perform better while overcoming any issues that have previously been noted.

Other objects that will be set include creating an Entity Relationship Diagram to demonstrate how each object in the CMDB interfaces with other entities. From a management perspective of this project, I will be needing to produce documentation such as an indicative test plan, a report on the functional requirements of the system, a Gantt chart and report on the prioritization and management of the various tasks throughout.

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# 12.Deliverables:

The first set of deliverables that I will be providing as part of my project include:

* A literature review of existing CMDB systems that have been developed and implemented, including the impacts of them on business operations.
* A report on the functional requirements of the system I am developing.
* An indicative test plan of all user-determined variables that are in the CMDB.
* System design documentation
* An Implementation Report detailing the system.

Further deliverables I will be providing in addition to this include:

* A final report of the system
* The CMDB and accompanying source code.
* A demonstration in the Viva presentation.

# 13.Resources and Constraints:

As previously mentioned, I have access to a wide collection and variety of different resources which are available to me. These may be existing literature in academic journals, videos or reading items where IT service technicians have discussed their usage of CMDBs, as well as other websites and articles which may be found in libraries. This project does have some significant constraints however, as I struggle with dyspraxia which affects my organisational skills and coordination, as well as other elements which make time management difficult. There are also other factors in my personal life which will have a big impact.

# 14.Sources of Information:

Throughout this project, I will be referencing numerous sources of information relating to both the CMDB itself and the management of the project. Thankfully, due to the widespread utilisation of Configuration Management Databases and their coverage in academia, there is a good selection of literature and resources I can access and utilise during the research phase of the project, as well as for future reference as development progresses over time.

Some examples of the literature I have found and will be researching include:

* Configuration Management Process Design and Implementation, 2009 Liu Ying, et al.
* A configuration management database architecture in support of IBM Service Management, 2007 Madduri et al.
* Requirements and Recommendations for the Realization of a Configuration Management Database, 2007 Schaaf & Gogetap

# 15. Risk Analysis:

Some risks associated with this project include time management, prioritization and other external factors which have the potential to interrupt or hinder progress on development items. I live at my family home during term time, and the house is being rewired which has made organisation, stable mains supply and therefore internet connection a challenge. Thankfully there are plenty of offline resources available via textbooks and portable storage for when I am working elsewhere away from home and the library. When this has all been completed and things are back up and running, development should be much more streamlined and efficient.

# 16.Schedule of Activities:

It is imperative that I keep a track of what activities I complete and prioritize according to the submission dates as specified in the module documentation. This is so I can ensure that the correct work items are submitted and completed. I have included a Gantt chart with the list of work items in both the module information and list of deliverables I have previously set out. Due to the evolving nature of the project, and several health and personal life issues encountered recently, this list is very much an incomplete early draft and may be subject to change.

REPORTING PERIOD: 10/11/2023 - 20/05/2024

TASKS DUE

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Start** | **End** | **Duration** |
| Project Contract submission | 15/12/2023 | 15/12/2023 | 1 day |
| Functional Requirements | 17/12/2023 | 19/12/2023 | 3 days |
| Indicative Test Plan | 20/12/2023 | 22/12/2023 | 3 days |
| New Years Eve | 30/12/2023 | 02/01/2024 | 4 days |
| System Design documentation | 03/01/2024 | 05/01/2024 | 3 days |
| Implementation Report | 06/01/2024 | 08/01/2024 | 3 days |
| Proofread | 09/01/2024 | 11/01/2024 | 3 days |
| First deliverable deadline | 11/01/2024 | 12/01/2024 | 2 days |
| Floating Mark Choice deadline | 15/03/2024 | 15/03/2024 | 1 day |
| Final report of the system | 16/03/2024 | 29/03/2024 | 14 days |
| CMDB and source code | 05/02/2024 | 18/02/2024 | 14 days |
| Demonstration (Viva presentation) | 20/04/2024 | 03/05/2024 | 14 days |
| Final delierable deadline | 02/05/2024 | 03/05/2024 | 2 days |

TASKS OVERDUE

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Start** | **End** | **Duration** |
| Intro | 21/11/2023 | 21/11/2023 | 1 day |
| Background | 22/11/2023 | 22/11/2023 | 1 day |
| Aims | 23/11/2023 | 23/11/2023 | 1 day |
| Objectives | 24/11/2023 | 24/11/2023 | 1 day |
| Home Rewire - Extension | 25/11/2023 | 04/12/2023 | 10 days |
| Deliverables | 11/12/2023 | 11/12/2023 | 1 day |
| Resources & Constraints | 12/12/2023 | 12/12/2023 | 1 day |
| Sources of Information | 13/12/2023 | 13/12/2023 | 1 day |

CRITICAL TASKS

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Start** | **End** | **Duration** |
| Demonstration (Viva presentation) | 20/04/2024 | 03/05/2024 | 14 days |
| Final delierable deadline | 02/05/2024 | 03/05/2024 | 2 days |

**17**.Student Signature:

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**ARAWN DAVIES**

# 18.Supervisor Signature: **Francois Siewe**

# 19.Date: 14/12/2023