System Architecture Definition

Document history

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| --- | --- | --- | --- | --- |
| Version | Date | Author | Changes | Valid from |
| 1.0 | 22-Aug-2016 | Hardik, Kwino & Patrick |  | 28-Aug-2016 |

Purpose of this document

• To provide a common understanding of the technical architectures to be used during development and deployment of the solution including:

o Hardware/Infrastructure

o Software Architecture

• To describe the target environment for the solution and (if different) the development environment.

• To provide an outline description of anticipated developments in areas such as:

o Hardware (i.e. the infrastructure, processing, storage, networking etc.) for both development and deployment

o Software (i.e. the major software objects or components - both process and data - and their interactions)

o Information Security (e.g. access policy, access control etc.)

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# System Architecture

# 1.1 Architecture Overview

This project aims to create a database evaluator which will diagnose and check the basic implementation parameters of SQL Server Instances and Databases. A more detailed list of the outputs of the project are as follows:

1. A client application that will produce a dump file containing details about a customer’s SQL Server database and instance parameters.

2. A product website where the customer can download the client application and upload the SQL Server dump files generated by the client application.

3. A database evaluator tool that will generate SQL Server evaluation reports using the data from the dump files uploaded by customers.

# 1.2 Hardware Components and Relationships

There are no hardware components involved in this project. Any machine that can run SQL Server can be used.

# 1.3 Software Components and Relationships

This project involves three software components which are as follows:

1. Product Website
2. Client Application
3. Database Evaluator

In the Database Evaluator System, there are also two main personas involved namely:

1. The Customer
2. The Project Team

The relationship between the software components and the personas is describe in the succeeding diagram.



# 1.4 Non-Functional Requirements

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| **Non-functional requirement** | **Priority 1=critical 2=important 3=unimportant** | **How this is supported by the architecture** |
| **Usability** | 2 | • The client application and database evaluator will only run on a Windows environment.  • The website is platform independent. It should be supported by all web browsers.  • “About” and “Help” information about the product must be retrievable at any point during the use of the application.  • In the client application, the customer must be able to choose the SQL Server name that needs to be evaluated from a list. A green mark must be there to indicate that the connection is successful.  • In the client application, the customer must see the progress of the application’s execution.  • The client application must be downloadable from the product website.  • The customer and project team must be notified if a dump file or an evaluation report is uploaded. |
| **Performance** | 1 | • The client application must collect the parameter values without any error. It should not also modify any existing values.  • The encrypted dump file must successfully upload on the website without any error.  • The database evaluator will check and produce the evaluation report without any errors. |
| **Capacity** | 2 | • The client application and database evaluator should be light weight and should not use too much RAM and disk space. It should also not invoke too much processes to make the system hang.  • The website should be able to accommodate around 300 users. |
| **Scalability** | 2 | • The capacity of the website is limited by the hardware and software currently installed in the target machine. |
| **Security** | 2 | • The dump file will be encrypted using a key.  • The website will require login credentials from users before the users can be able to upload and view files. |
| **Availability & peak usage** | 2 | • The website should be available to the specified amount of users at all times if possible. |
| **Resilience & recovery** | 3 | • If time will permit, a recovery plan will be established to back-up the database and other needed files after a set period of time. |
| **Supportability** | 2 | • The client application and database evaluator can only be run on a Windows machine with the .NET framework installed.  • The client application and database evaluator should support the SQL Server 2008 R2 and SQL Server 2012.  • The website should be compatible with all popular web browsers. |
| **Implementation** | 2 | • The client application and database evaluator will be developed using C#.  • SQL Server 2008 R2 and SQL Server 2012 will be used for creating the databases and the SQL scripts.  • The website will be created using Wordpress and MySQL. |

# 1.5 Maintainability Considerations

To ensure the maintainability of the software being created, some coding standards will be followed as follows:

1. Comments

Comments will be placed throughout the code base to ensure that the different functions and logic involved can be easily understood by future developers.

1. Code Formatting

The code will be formatted as per standards to enhance the readability of the programs.

1. Testing

There will be regular testing of functionalities to ensure that everything works as per design and no previous features are broken by newly created ones.

1. Documentation

All software produced would have their corresponding technical documentation to give an overview of how it works and how it is structured.

# Technical Environments

# 2.1 Development Platform

The developers are using machines and software with the following specifications:

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| --- | --- |
| **Hardware** | |
| **Operating system** | Windows 10 |
| **CPU** | Intel(R) Core(TM) i7-4790 |
| **Memory** | 8 GB RAM |
| **Hard drive** | 500 GB |

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| **Software** | |
| **IDE** | Microsoft Visual Studio Enterprise 2015 Update 1  Eclipse for PHP Developers Release 4.5.2 |
| **Web Development** | XAMPP for Windows Version 5.6.21  PHP 5.6.21  phpMyAdmin 4.5.1  MariaDB 10.1.13  Apache 2.4.17 |
| **Windows Form Development** | Git version 2.9.2  Install Shield 2015 Limited Edition  SQL Server 2016  SQL Server 2016 Management Studio |

# 2.2 Target Platform

The requirements for the target platforms are detailed as follows:

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| **Website Server Machine** | |
| **Operating System** | Windows XP or higher |
| **CPU** | Pentium 4 1.5 GHz or Athlon XP 1500+ processor or higher |
| **Memory** | 2 GB RAM |
| **Hard Drive** | 500 MB available in the hard disk |
| **Software** | PHP 5.6.21  MariaDB 10.1.13  Apache 2.4.17 |

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| **Client Application Machine** | |
| **Operating System** | Windows XP or higher |
| **CPU** | Pentium 4 1.5 GHz or Athlon XP 1500+ processor or higher |
| **Memory** | 2 GB RAM |
| **Hard Drive** | 500 MB available in the hard disk |
| **Software** | .NET Framework 4.5.2 |

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| **Database Evaluator Machine** | |
| **Operating System** | Windows XP or higher |
| **CPU** | Pentium 4 1.5 GHz or Athlon XP 1500+ processor or higher |
| **Memory** | 2 GB RAM |
| **Hard Drive** | 500 MB available in the hard disk |
| **Software** | .NET Framework 4.5.2  SQL Server 2016 |