SYSTEM MANUAL

ON

DATA MANAGEMENT SYSTEM

FOR

BUILDINGS ENERGY EFFICIENCY ORDINANCE

FOR

ENERGY EFFICIENCY OFFICE

OF

ELECTRICAL AND MECHANICAL SERVICES DEPARTMENT (EMSD)

機電工程署
EMSD

By

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1. PURPOSE

This document provides an overview of the e-Services integration for Data Management System for Buildings Energy Efficiency Ordinance (DMS-BEEO) regarding programs, data files, equipment, clerical procedure, computer operation procedure, and etc. Reader interested in specific area may refer to the corresponding manuals (Data Manual, Program Manual, etc.)

2. SCOPE

This document provides an overview of the e-Services integration for Data Management System for Buildings Energy Efficiency Ordinance (DMS-BEEO). It lists out in brief the programs, equipment, etc. in the system only. Details of specific areas are documented in the manuals referred to in the References section.

3. REFERENCES

3.1 Standards

- Document Style Manual (S14)
- Documentation Standard for Implementation Phase Version 3 (S8)

3.2 Other References

- System Analysis & Design Report
- Selected Technical System Option
- Program Manual
- Data Manual
- Application Operation Manual
- Application User Manual
- Computer Operating Procedures Manual
- Hardware and Software Procured, Installed and Accepted
- System Installation Plan
- System Maintenance Plan

4. DEFINITION AND CONVENTION

4.1 Definition

In this document, unless the context otherwise requires, the following expressions have the following meanings:

Term	Definition
BEEO	Buildings Energy Efficiency Ordinance
WBRS	Web-based Registration Services for online application submission.
DMS	Data Management System
REA	Registered Energy Assessor
COCR	Certificate of Compliance Registration
FOC	Form of Compliance
VM	Virtual Machine

5. SYSTEM SUMMARY

5.1 Objectives

The Buildings Energy Efficiency Ordinance (Cap. 610) (BEEO) had been enacted in November 2010. To facilitate the application submission from public, EMSD has developed a web-based registration system (WBRS) for regulatory services divisions to receive online submissions under various EMSD legislations. It is planned that the WBRS for BEEO will be incorporated into the overall WBRS of EMSD with enhanced functions.

The objective of implementing the DMS are:

1. To facilitate automation of the process of checking, vetting and approval of submissions, and generation of reports, certificates, registers and database of buildings under Buildings Energy Efficiency Ordinance
2. To streamline the enforcement functions under the Ordinance
3. To provide internet platform for public or any relevant parties to search for status of application, registers of Certificate of Compliance Registration (COCR) and Registered Energy Assessor (REA), records of Form of Compliance (FOC) and Improvement Notice (IN), and acts as an interactive platform for disseminating energy efficiency and conservation messages to the general public
4. To integrate with Web-Based Registration Services (WBRS) to provide means for electronic application submissions to the public

5.2 System Functions

5.2.1 Assignment of WBRS Records

Function ID	Function Description	Mode	Frequency	Requirement ID
ASS-001	Search WBRS Records of COCR/FOC	Online/ Update	(Min: 0 Avg: 1000 Max: 2000)	REQ-3001
ASS-002	View WBRS Records of EE1	Online/ Update	(Min: 0 Avg: 300 Max: 600)	REQ-3001
ASS-003	View WBRS Records of EE2	Online/ Update	(Min: 0 Avg: 300 Max: 600)	REQ-3001
ASS-004	View WBRS Records of EE3	Online/ Update	(Min: 0 Avg: 300 Max: 600)	REQ-3001
ASS-005	View WBRS Records of EE4	Online/ Update	(Min: 0 Avg: 700 Max: 1400)	REQ-3001
ASS-006	Search WBRS Records of REA	Online/ Update	(Min: 0 Avg: 200 Max: 400)	REQ-2001
ASS-007	View WBRS Records of REA1	Online/ Update	(Min: 0 Avg: 200 Max: 400)	REQ-2001
ASS-008	View WBRS Records of REA3	Online/ Update	(Min: 0 Avg: 200 Max: 400)	REQ-2001

5.2.2 Registered Energy Assessor

Function ID	Function Description	Mode	Frequency	Requirement ID
REA-001	Maintain REA Case	Online/ Update	(Min: 0 Avg: 200 Max: 400)	REQ-2001 REQ-2002 REQ-2003
REA-002	Genereate REA E-Licence	Online/ Update	(Min: 0 Avg: 200 Max: 400)	REQ-1004 REQ-1005 REQ-2002 REQ-2003 REQ-5004
REA-003	Maintain REA Registration	Online/ Update	(Min: 0 Avg: 200 Max: 400)	REQ-2002 REQ-2003

5.2.3 Certificate of Compliance Registration

Function ID	Function Description	Mode	Frequency	Requirement ID
COCR-001	Maintain COCR Case	Online/ Update	(Min: 0 Avg: 300 Max: 600)	REQ-3001 REQ-3002 REQ-3003
COCR-002	Genereate COCR E-Licence	Online/ Update	(Min: 0 Avg: 300 Max: 600)	REQ-1004 REQ-1005 REQ-3002 REQ-3003 REQ-5004
COCR-003	Maintain COCR Registration	Online/ Update	(Min: 0 Avg: 300 Max: 600)	REQ-3002 REQ-3003

5.2.4 E-Tracking

Function ID	Function Description	Mode	Frequency	Requirement ID

6. EQUIPMENT CONFIGURATION

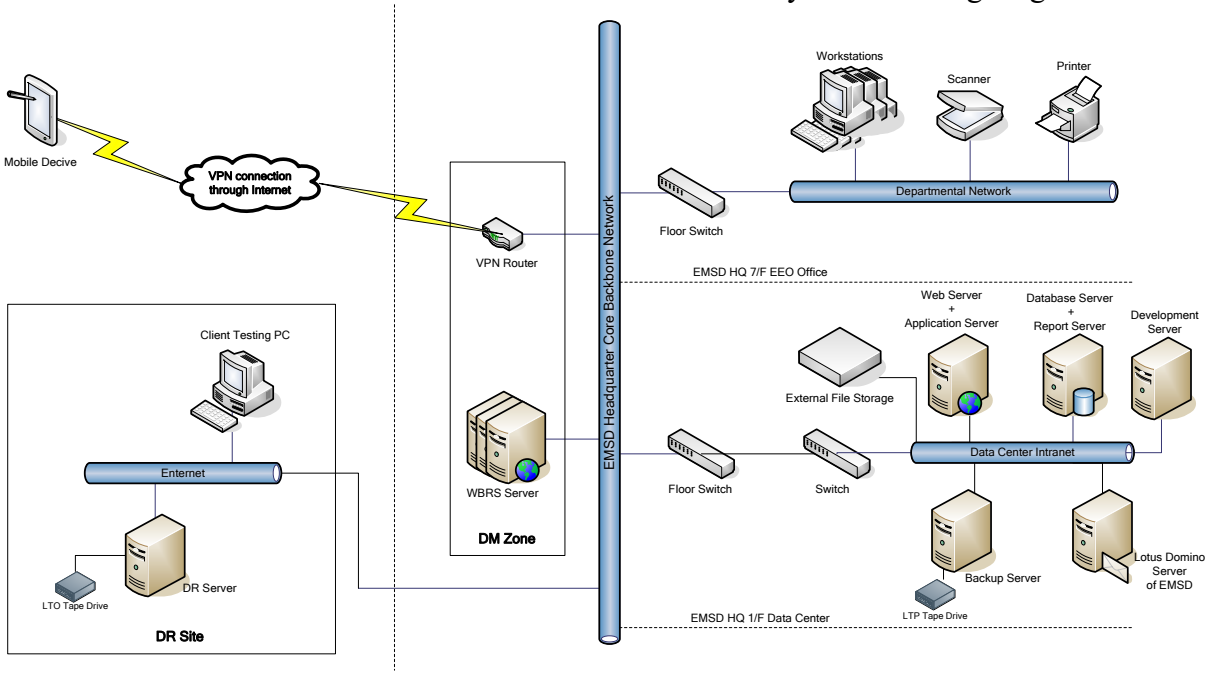
This section provides the equipment configuration which describes the inter-relationship among all hardware components including communication network.

The information in this section can also be found in the Computer Operating Procedures Manual.

6.1 Computer Hardware & Network

6.1.1 Network Overview

The overall architecture of the DMS-BEEO can be illustrated by the following diagram:



The DMS system will be resided at Data Center of EMSD Headquarter. Users can access DMS using their own PC through Departmental Network. For remote users using mobile device, they can access departmental network through Virtual Private Network (VPN) and then access DMS.

6.1.2 Summary of Network Address

IP	Host Name	Description	Machine Type (Physical/ Virtual)	Location
10.16.133.22	Server01	VMware vSphere server	Physical	1/F Watson Centre, Kwai Chung
10.16.133.23	Server02	VMware vSphere server	Physical	1/F Watson Centre, Kwai Chung
10.16.133.214	beeodmsapp	Application server (production)	Virtual	Server02
10.16.133.215	beeodmsdb	Database server (production)	Virtual	Server02
10.16.133.216	beeodmsdev	Application server and Database server (Development)	Virtual	Server01

6.1.3 Production Web and Application Server

Hardware Configuration	Details
Host Name	BEEODMSAPP
Function	Production Web & Application Server
IP Address	10.16.133.214
Subnet Mask	255.255.255.0
Default Gateway	10.16.133.254
Domain	EMSD.HKSARG
Processor	2 Processors @ 3.20GHz 3.19GHz
RAM	32GB
HDD	299GB

Software	Details
OS Name	Microsoft Windows Server 2019 Standard x64
OS Version	10.0.17763 N/A Build 17763
IIS	10
SSL	Certificates Installed
.NET Framework	Version 4.8.03761

6.1.4 Production Database Server

Hardware Configuration	Details
Host Name	BEEODMSDB
Function	Production Database Server
IP Address	10.16.133.215
Subnet Mask	255.255.255.0
Default Gateway	10.16.133.254
Domain	EMSD.HKSARG
Processor	2 Processors @ 3.20GHz 3.19GHz
RAM	32GB
HDD	C : 299GB D : 999GB

Software	Details
OS Name	Microsoft Windows Server 2019 Standard x64
OS Version	10.0.17763 N/A Build 17763
SQL Server	Microsoft SQL Server 2017 (RTM-GDR) (KB4583456) - 14.0.2037.2 (X64)

6.1.5 UAT/DEV Web and Application Server

Hardware Configuration	Details
Host Name	BEEODMSDEV
Function	UAT/DEV Web & Application Server
IP Address	10.16.133.216
Subnet Mask	255.255.255.0
Default Gateway	10.16.133.254
Domain	EMSD.HKSARG
Processor	2 Processors @ 3.20GHz 3.19GHz
RAM	32GB
HDD	1TB

Software	Details
OS Name	Microsoft Windows Server 2019 Standard x64
OS Version	10.0.17763 N/A Build 17763
IIS	10
SSL	Certificates Installed
.NET Framework	Version 4.8.03761

6.1.6 UAT/DEV Database Server

Hardware Configuration	Details
Host Name	BEEODMSDEV
Function	UAT/DEV Database Server
IP Address	10.16.133.216
Subnet Mask	255.255.255.0
Default Gateway	10.16.133.254
Domain	EMSD.HKSARG
Processor	2 Processors @ 3.20GHz 3.19GHz
RAM	32GB
HDD	1TB

Software	Details
OS Name	Microsoft Windows Server 2019 Standard x64
OS Version	10.0.17763 N/A Build 17763
SQL Server	Microsoft SQL Server 2017 (RTM-CU28) (KB5008084) - 14.0.3430.2 (X64)

7. SOFTWARE INVENTORIES

This section summarizes all software that is required for the operational running of the system.

7.1 Inventory of Application Programs

The binary files containing application programs are listed below. Detailed documentation of the programs is given in the Program Manual.

Description	Item	Location
DMS-BEEO Application Main Folder	DMS-BEEO Code	D:\csudemo
ASP.NET AJAX Control Toolkit	AjaxControlToolkit.dll	D:\csudemo\bin
PDF library	itextsharp.dll	D:\csudemo\bin
Microsoft Report Viewer	Microsoft.ReportViewer.*.dll	D:\csudemo\bin
Free PDF API	Spire.*.dll	D:\csudemo\bin
A .NET library for reading and writing CSV files	CsvHelper.dll	D:\csudemo\bin
JSON framework for .NET	Newtonsoft.Json.dll	D:\csudemo\bin

7.2 Inventory of System Software and Software Package

Device	Software	Version
Production Web and Application Server	Microsoft Windows Server	2019 Standard x64 10.0.17763 N/A Build 17763
	IIS	10
	.NET Framework	Version 4.8.03761
Production Database Server	Microsoft Windows Server	2019 Standard x64 10.0.17763 N/A Build 17763
	Microsoft SQL Server	2017 (RTM-GDR) (KB4583456) - 14.0.2037.2 (X64)

8. SECURITY AND BACKUP

8.1 System Control

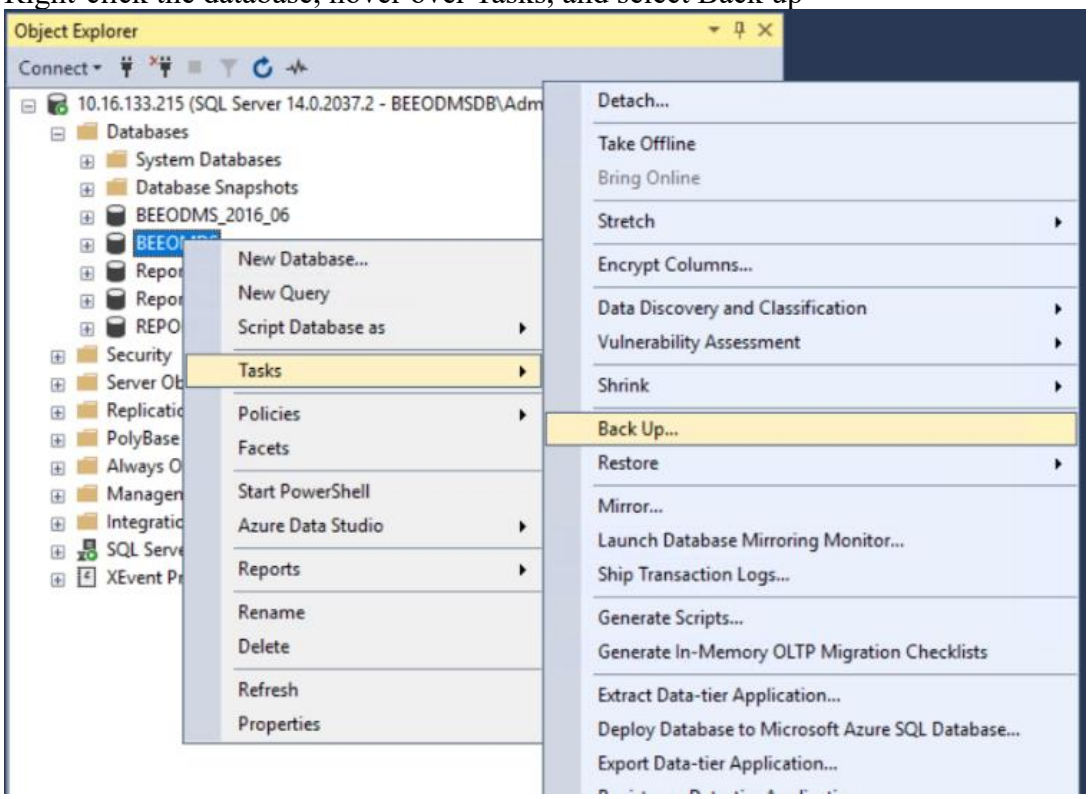
The security measures provided by DMS are:

- User name / password system login
- Encrypted password stored in the database system
- Function level access control for individual user
- All data is transferred between the user's web browser and the system via the SSL protocol to prevent eavesdropping, tampering and forgery

8.2 Database Backup

Below are the steps for manually backup the BEEODMS database.

1. Login into production database server
2. Launch SQL Server Management Studio (SSMS) and connect to production SQL Server instance.
3. Expand the Databases node in Object Explorer.
4. Right-click the database, hover over Tasks, and select Back up



5. Under Destination, confirm the path for your backup is correct. If you need to change this, select Remove to remove the existing path, and then Add to type in a new path. You can use the ellipses to navigate to a specific file.
6. Select OK to take a backup of your database.

8.3 System Backup

The source code of DMS is in Azure DevOps, which is managed by version control.

8.4 Recovery

The procedures to resume back to normal system configuration and the actions to be taken after restoration are documented in the T331 Disaster Recovery Drill Test Report (DR).

8.5 Security

8.5.1 Physical Security

Servers and network equipments will be protected from unauthorized access. The server equipments will be housed in locked racks in the server room designated for the EMSD Regulatory Services at EMSTF Kowloon Bay Data Centre that allows entries of authorized personnel only.

8.5.2 Access Control

In order to ensure that system security is maintained, proper security control procedures will be imposed. There are two levels of access control:

- DMS Application – access control is done by setting up different application user accounts, allowing them to access different application functions according to their business need
- System Level – login accounts for various servers and database are kept by Administrators only for system administration purpose, such as tracing problem, backup, etc.

Details of user account and function / access right mapping are documented in the T225 Selected TSO.

8.5.3 Data Encryption

Based on the Security Regulations, restricted data in DMS will be stored in unencrypted format while transmission of restricted data on un-trusted network will be encrypted.

Restricted data transferred between DMS servers will be protected by the Internet Protocol Security (IPsec) which is an encryption protocol for secure encrypted data transmission at the network layer. It is supported by all common operating systems such as UNIX and Windows 2008. Electronic certificates for Intranet will be used for IPsec authentication and will be provided by EMSD for both production and development purposes.

Data transferred between DMS and its interfacing systems, namely WBRS and CIG, will be protected by using Hypertext Transfer Protocol Secure (HTTPS) connections and secure web service.

Data transferred between the DMS web server and client workstations will be protected by using the Secure Sockets Layer (SSL) protocol to ensure that data sent from the application's server pages are encrypted.

Some data, e.g. password, is to be stored in encrypted or hashed format by nature based on renowned algorithms before storing into the database.

8.5.4 Security Patches Update

After security patches are available, Maintenance Team would perform impact analysis, make recommendation and consult EMSD before applying the patches. Other necessary actions and procedures relating to patch update will follow the same as provided in the System Maintenance Plan.

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