# COMPUTER OPERATION PROCEDURE 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

AUTOMATED SYSTEMS (HK) LTD.
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# Table of Contents

# 1. Purpose

The purpose of this is to provide information and operating instructions related to the operating of the computer systems, BEEO-DMS system.

# 2. Scope

This document defines the computer operating procedures manual for (DMS-BEEO). It should be reference for all operation staff involved in (DMS-BEEO) operation.

# 3. Reference

Documentation Standards for Implementation Phase (S8)

# 4. Definitions and Conventions

## 4.1 Definitions

| | |
|---|---|
| DMS | Data Management System |
| DB | MS SQL Database |
| Rptserv | MS SQL Report Server |
| LN | Lotus Notes |
| IP | Internet Protocol |
| LAN | Local Area Network |
| VM | Virtual Machine |
| SAN | Storage Area Network |
| iDRAC | Integrated Dell Remote Access Controllers |

## 4.2 Conventions

NIL

# 5. Computer System Information

This section mentions the system information for the computer systems, including:

- Hardware Configuration
- Communication Network configuration
- Hardware Components Description
- System Software Environment
- Application Software

## 5.1 Hardware Configuration

This section describes the virtual machine for application servers, database servers, the VMware vSphere physical machines, network equipment to be required by the system.

<table>
<tr><th>Hardware Item</th><th>Host Name/ Item No.</th><th>Description</th><th>Machine Type (Physical/ Virtual)</th><th>Location</th></tr>
<tr><td>VMware vSphere server</td><td>server01</td><td>HP ProLiant DL380 Gen10<table><tr><th>Item</th><th>Description</th></tr><tr><td>OS</td><td>VMWare ESXi 6.7</td></tr><tr><td>CPU</td><td>Intel Xeon Gold 6134</td></tr><tr><td>RAM</td><td>128 GB</td></tr><tr><td>DISK</td><td>15TB in RAID 6</td></tr></table></td><td>Physical</td><td>1/F Watson Centre, Kwai Chung</td></tr>
<tr><td>VMware vSphere server</td><td>server02</td><td>HP ProLiant DL380 Gen10<table><tr><th>Item</th><th>Description</th></tr><tr><td>OS</td><td>VMWare ESXi 6.7</td></tr><tr><td>CPU</td><td>Intel Xeon Gold 6134</td></tr><tr><td>RAM</td><td>128 GB</td></tr><tr><td>DISK</td><td>15TB in RAID 6</td></tr></table></td><td>Physical</td><td>1/F Watson Centre, Kwai Chung</td></tr>
<tr><td>Backup Server</td><td>beeoba01</td><td>HP ProLiant DL380 Gen10<table><tr><th>Item</th><th>Description</th></tr><tr><td>OS</td><td>VMWare ESXi 6.7</td></tr><tr><td>CPU</td><td>Intel Xeon Silver 4108</td></tr><tr><td>RAM</td><td>64 GB</td></tr><tr><td>DISK</td><td>11TB in RAID 6</td></tr></table></td><td>Physical</td><td>1/F Watson Centre, Kwai Chung</td></tr>
<tr><td>Application Server (production)</td><td>beeodmsapp</td><td><table><tr><th>Item</th><th>Description</th></tr><tr><td>OS</td><td>Microsoft Windows Server 2019 Standard</td></tr><tr><td>OS Version</td><td>10.0.17763 Build 17763</td></tr><tr><td>VM</td><td>VMware 7</td></tr><tr><td>CPU</td><td>Intel Xeon Gold 6134</td></tr><tr><td>RAM</td><td>32 GB</td></tr><tr><td>DISK</td><td>600 GB</td></tr></table></td><td>Virtual</td><td>Server02</td></tr>
<tr><td>Database Server (production)</td><td>beeodmsdb</td><td><table><tr><th>Item</th><th>Description</th></tr><tr><td>OS</td><td>Microsoft Windows Server 2019 Standard</td></tr><tr><td>OS Version</td><td>10.0.17763 Build 17763</td></tr><tr><td>VM</td><td>VMware 7</td></tr><tr><td>CPU</td><td>Intel Xeon Gold 6134</td></tr><tr><td>RAM</td><td>32 GB</td></tr><tr><td>DISK</td><td>1.3 TB</td></tr></table></td><td>Virtual</td><td>Server02</td></tr>
</table>

<table>
<tr><td>Application Server (Development)</td><td>beeodmsdev</td><td><table><tr><th>Item</th><th>Description</th></tr><tr><td>OS</td><td>Microsoft Windows Server 2019 Standard</td></tr><tr><td>OS Version</td><td>10.0.17763 Build 17763</td></tr><tr><td>VM</td><td>VMware 7</td></tr><tr><td>CPU</td><td>Intel Xeon Gold 6134</td></tr><tr><td>RAM</td><td>32 GB</td></tr><tr><td>DISK</td><td>1 TB</td></tr></table></td><td>Virtual</td><td>Server01</td></tr>
<tr><td>Database Server (Development)</td><td>beeodmsdev</td><td><table><tr><th>Item</th><th>Description</th></tr><tr><td>OS</td><td>Microsoft Windows Server 2019 Standard</td></tr><tr><td>OS Version</td><td>10.0.17763 Build 17763</td></tr><tr><td>VM</td><td>VMware 7</td></tr><tr><td>CPU</td><td>Intel Xeon Gold 6134</td></tr><tr><td>RAM</td><td>32 GB</td></tr><tr><td>DISK</td><td>1 TB</td></tr></table></td><td>Virtual</td><td>Server01</td></tr>
<tr><td>LAN Switch</td><td></td><td></td><td>Physical</td><td>1/F EMSD HQ</td></tr>
<tr><td>Computer Equipment Rack</td><td></td><td></td><td>Physical</td><td>1/F EMSD HQ</td></tr>
<tr><td>iPad</td><td></td><td></td><td>Physical</td><td>M/F EMSD HQ</td></tr>
</table>

## 5.2 Communication Network Configuration

This section describes the configuration setting of all servers for connection to EMSD departmental network

| IP | Host Name | Description | Machine Type (Physical/Virtual) |
|---|---|---|---|
| 10.16.133.22 | server01 | VMware vSphere server | Physical |
| 10.16.133.23 | server02 | VMware vSphere server | Physical |
| 10.16.133.32 | beeoba01 | Backup Server | Physical |
| 10.16.133.214 | beeodmsapp | Application Server (production) | Virtual |
| 10.16.133.215 | beeodmsdb | Database Server (production) | Virtual |
| 10.16.133.216 | beeodmsdev | Application Server (Development) | Virtual |
| 10.16.133.216 | beeodmsdev | Database Server (Development) | Virtual |

## 5.3 Other Hardware Components Description

### 5.3.1 San storage

The san storage holds the data stores for the VM machine.

### 5.3.2 San Switch

The san switch allows many to many communications between the san storage and the other server through optical fibre channel protocol.

### 5.3.3 Lan Switch

The Lan switch allows many to many communications between system and EMSD departmental network.

### 5.3.4 iPad

The mobile device used for mobile inspection.

### 5.3.5 Computer Equipment Rack

The standard 19-inch rack is a standardized frame for mounting multiple equipment modules and servers.

## 5.4 System Software Environment

### 5.4.1 Application Software

| Device/ Host Name | Software ID/Name | Version / Release no. | Description |
|---|---|---|---|
| beeodmsapp | Windows 2019 Server standard | 10.0.17763 Build 17763 | Operation system |
| | Symantec Endpoint Protection | 14 build 1148 | Anti-Virus |
| beeodmsdb | Windows 2019 Server standard | 10.0.17763 Build 17763 | Operation system |
| | SQL Server 2017 | (RTM-CU28) (KB5008084) - 14.0.3430.2 (X64) | Database software |
| | Symantec Endpoint Protection | 14 build 1148 | Anti-Virus |
| beeodmsdev | Windows 2019 Server standard | 10.0.17763 Build 17763 | Operation system |
| | SQL Server 2017 | (RTM-CU28) (KB5008084) - 14.0.3430.2 (X64) | Database software |
| | Symantec Endpoint Protection | 14 build 1148 | Anti-Virus |

# 6. Computer System Operating (Normal)

This section mentions the operating procedures of performing the following tasks for operating staff under the computer systems, web-based BEEO-DMS system, including:

- Turning On/Off the Servers
- Switching On/Off the Hardware Components
- Loading the Computer Systems
- Shutting Down the Computer Systems

## 6.1 Turning ON/OFF The Servers

### 6.1.1 Turn Off the Servers

Before turning off the servers, operating staff is required to check whether the backup jobs (For more details, please refer to Section **Error! Reference source not found.**) related to that server are being run or not.

After operating staff has verified that there are no backup job(s) related to that server being run, operating staff is required to follow the steps below in order to turn off the servers:

a. Login the server.

b. Click the “Start” button from the menu of the network operating system

c. Select “Shutdown”

Below is the screen shown after the above procedures have been performed.

### 6.1.2 Backup Job

In order to check whether the backup job(s) is/are running on the Backup server, operating staff is required to check the Job Status of the Tape Backup Software, BackupExec, on the backup server.

It is recommended NOT to turn off the servers when there is/are backup job(s) being run on that server. Otherwise, data may be lost owing to the incomplete running of the backup job(s).

### 6.1.3 Turn On the Servers

To turn on the servers, operating staff is required to press the "Power" button of the server. The location of the "Power" button is subject to the model of the server. Operating staff may refer to the specification of the servers.

After the "Power" button of the server has been pressed, the Windows operating system will be loaded. After the operating system has been loaded, operating staff is required to perform the procedures mentioned below:

a) Login the server as Administrator
b) Load the services on the servers (Refer to Section **Error! Reference source not found.** for more details)
c) Press Lock the Console for Secure Console from any unauthorized access.

Note: A visit to the server room is required to accomplish the task of turning on the servers.

## 6.2 Switching ON/OFF the Hardware Components

Before switching on/off other hardware components (like Tape Drive etc.), in general, operating staff is required to seek approval from the responsible parties so as to access the physical location of the hardware components. Access card(s)/key(s) may be required to access the server room and the cabinet where the hardware components are placed.

In order to switch on/off the hardware components, operating staff is required to press the "Power" buttons of the hardware components. The locations of the "Power" buttons are subject to different models of the hardware components. Operating staff may also need to configure the software related to that hardware components. Please refer to the specification of the hardware components for further details.

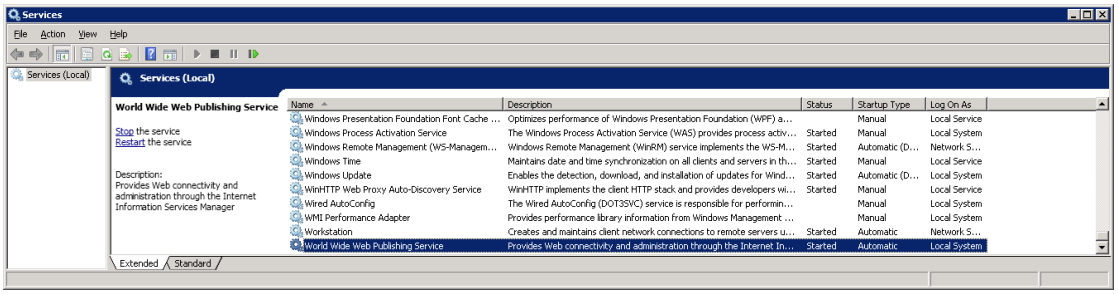
## 6.3 Loading the Computer System

In case there is any maintenance on the system, some of the servers are required to perform manual loading or shutting down. Operating staff is required to perform the procedures mentioned below to perform manual loading of the services.

### 6.3.1 Load Services on Application Server

In order to load the services on Application server, operating staff is required to follow the procedures mentioned below:

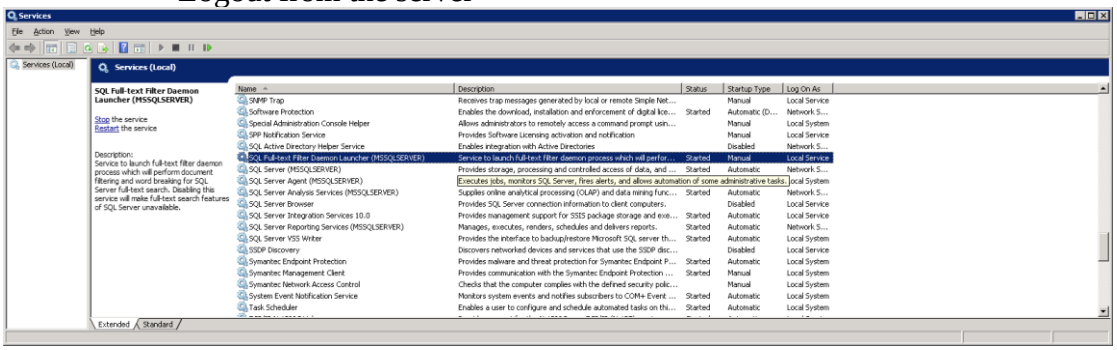
- ☞ Login as Administrator
- ☞ Ensure the service “World Wide Web Publishing Service” is started
- ☞ Logout from the server




### 6.3.2 Load Services on Database Server

In order to load the services on Database server, operating staff is required to follow the procedures mentioned below:

- ☞ Login as Administrator
- ☞ Ensure the services for SQL server are started
- ☞ Logout from the server




## 6.4 Shutting Down the Computer Systems

In case there is any maintenance on the system, some of the servers are required to perform manual loading or shutting down. Operating staff is required to perform the procedures mentioned below to perform manual shutting down of the services.

### 6.4.1 Shut Down Services on Application Server

In order to shut down the services on Application server, operating staff is required to follow the procedures mentioned below:

- ☞ Login as Administrator
- ☞ Stop the service “World Wide Web Publishing Service”
- ☞ Logout from the server

### 6.4.2 Shut Down Services on Database Server

In order to shut down the services on Database server, operating staff is required to follow the procedures mentioned below:

- ☞ Login as Administrator
- ☞ Stop the services for SQL server are started
- ☞ Logout from the server

## 6.5 Scheduling

### 6.5.1 Backup Jobs

Backup job of BackupExec on Backup server is scheduled to run periodically.

### 6.5.2 Schedule Jobs

The schedule jobs are listed in the table below whereas they are executed by BEEO-DMS application:

| **Job Name** | **Program description** |
|---|---|
| BJ_Checklist_MobileList | To generate mobile inspection checklist. |
| BJ_LetterAction | To generate letters in batch. |
| WBRS_data_sync | To synchronize e-submission data to BEEO-DMS. |
| WBRS_file_sync | To synchronize e-submission attachment files to BEEO-DMS. |
| BEEOGENREPORT | To generate reports periodically. |
| BJ_SendElicenceEmail | To send email with E-Licence as attachment to applicant and inform related parties. |

## 6.6 Media Placement

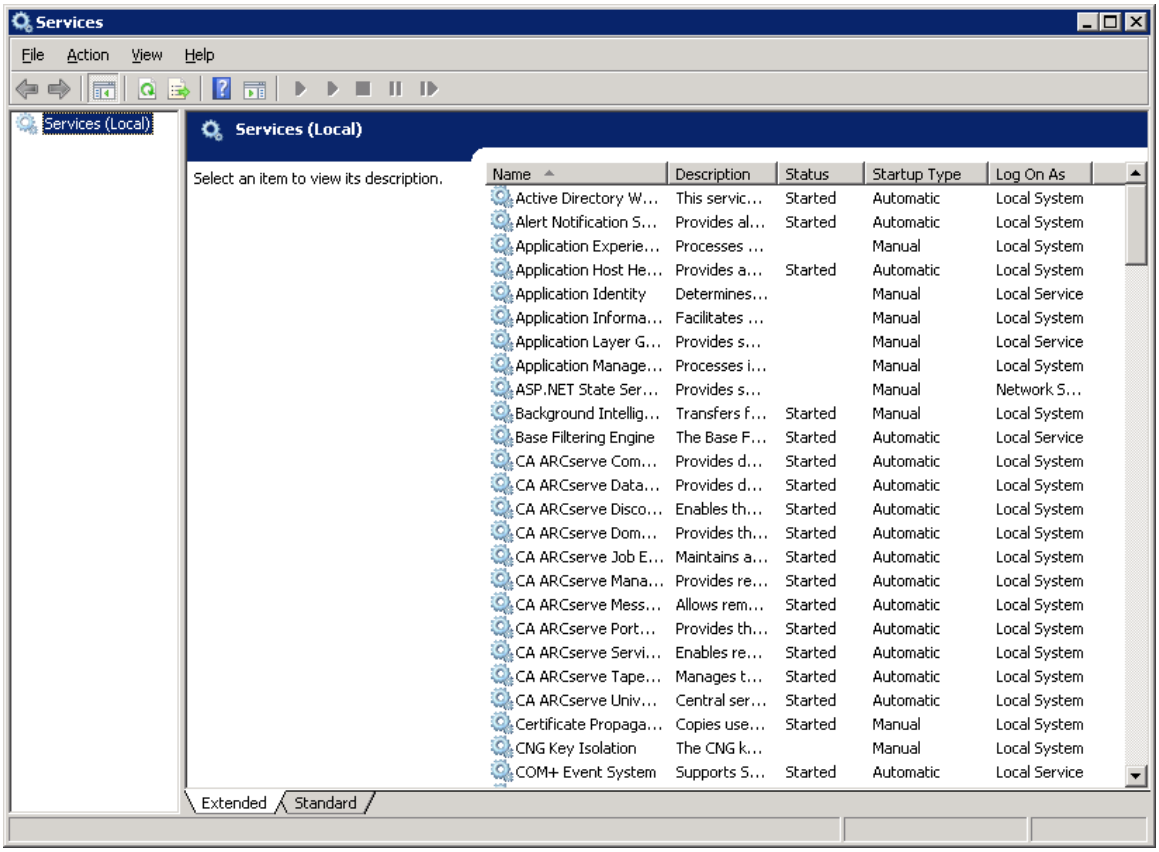
1 set of backup tapes of weekly full backup shall be kept off-site (Data Center at Siu Ho Wan) with the conditions supporting the storage of backup tapes. The sets of tapes will be call back when the set of tapes which are going to be used again.

## 6.7 System Monitoring Tasks

### 6.7.1 Ensure Services Running in Windows 2019 Servers

In order to check the status of the services, operating staff is required to perform the following steps:

- ☞ Select “Start” from the lower left-hand corner of the console
- ☞ Select “Administrative Tools”
- ☞ Select “Services”




Operating staff can ensure the services are automatically initiated by verifying their statuses (“狀態”) are started (“啟動”).

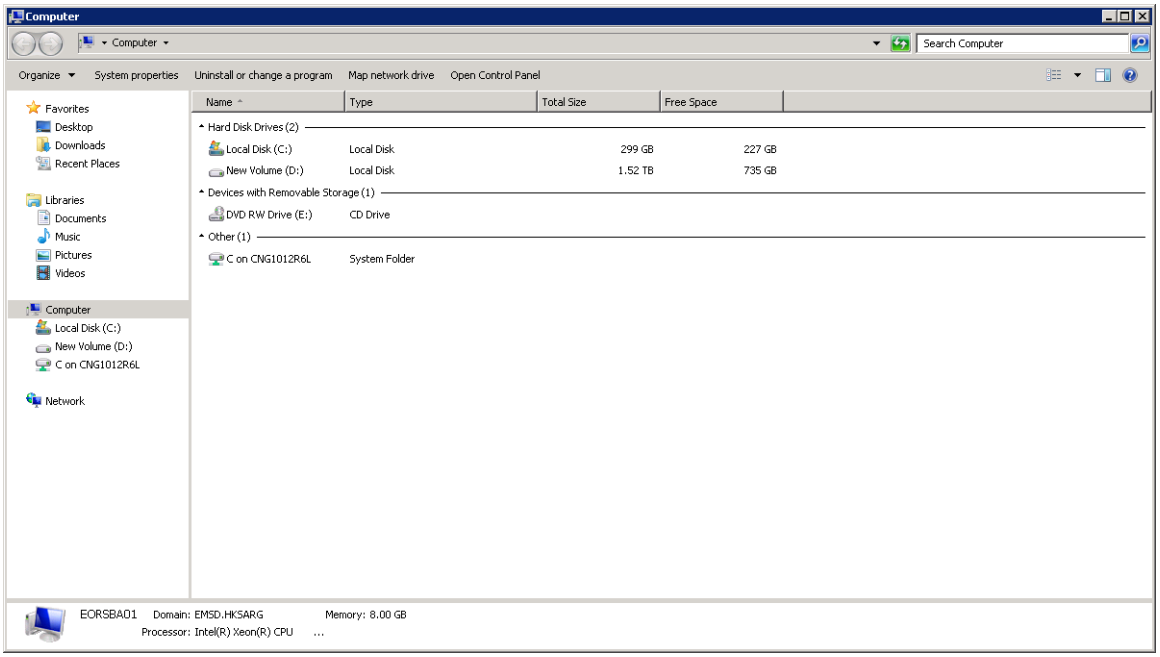
If the system services are not started, operation staff can start the services by right-click on the services and choose “Start” (“啟動”).

To stop a system services, operation staff can start the services by right-click on the services and choose “Stop” (“停止”).

### 6.7.2 Monitor Disk Space Utilization in Windows 2019 Servers

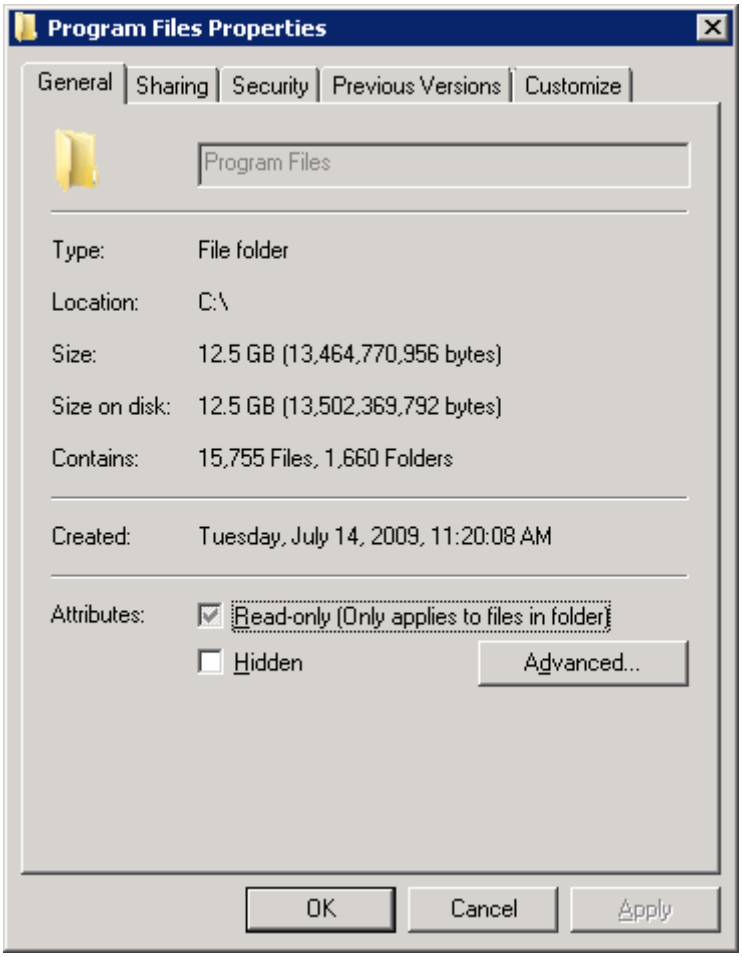
To observe the disk space utilisation, operating staff is required to perform the following steps:

☞ In desktop, place the mouse cursor over the icon “Computer” and then right-click to select “Open”. A window of file explorer will be shown as follows:




☞ The total disk capacity assigned to each drive is shown in the column “Total Size”. And the disk free space is shown in the column “Free Space”. (In the above example, Drive (C:) has the disk capacity of 299GB and remains 227GB of free storage).
An appropriate disk cleaning up should be performed if free storage is less than 10% of total disk capacity. Or management team should be notified if hardware upgrade is necessary.

☞ To view the disk usage of a particular folder, place the mouse cursor over the selected folder and right-click to select “Properties”.
The following properties window will be shown:

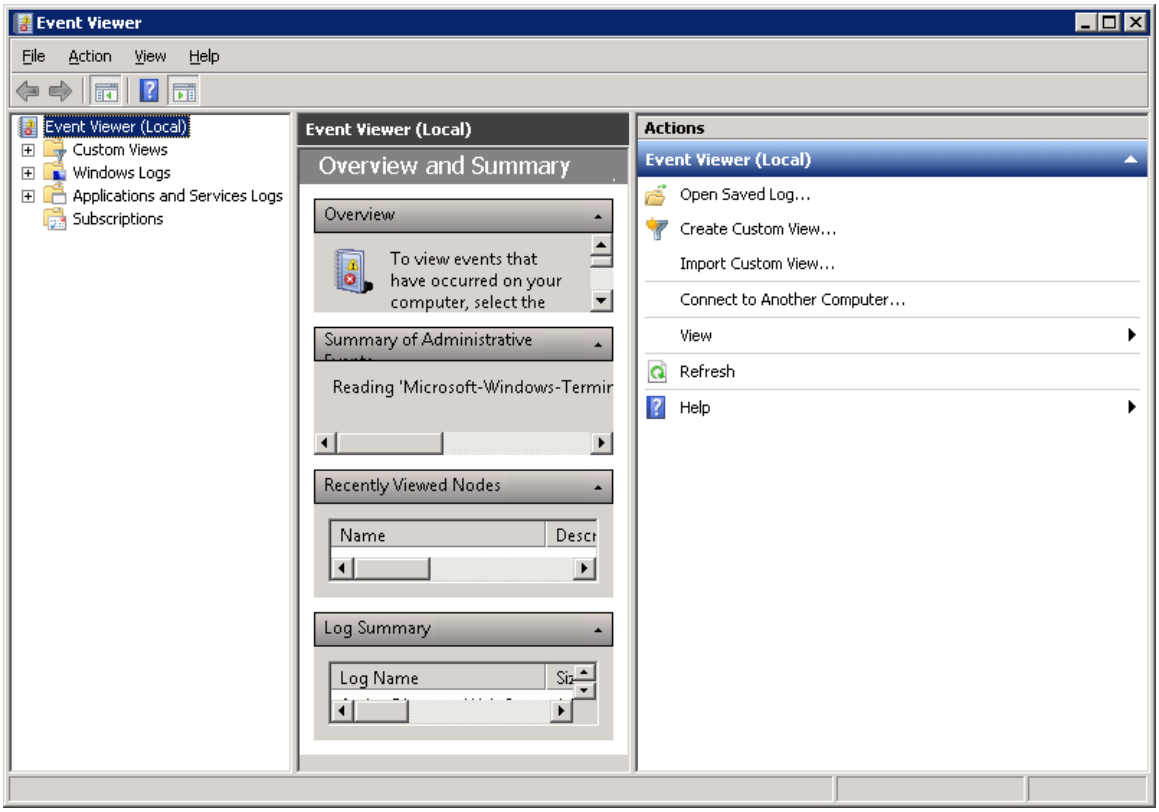



☞ The folder size is shown at “Size:”. (In the above example, the “Program Files” folder occupied in Drive (C:) with a space of 12.5GB)

### 6.7.3 Inspect Events in Windows 2019 Servers

To view the system event log, operating staff is required to perform the following steps:

☞ Select “Start” from the lower left-hand corner of the console
☞ Select “Administrative Tools”
☞ Select “Event Viewer”




☞ Operating staff must observe regularly the system log and application log by selecting “Application” and “System” of “Windows Logs” respectively.

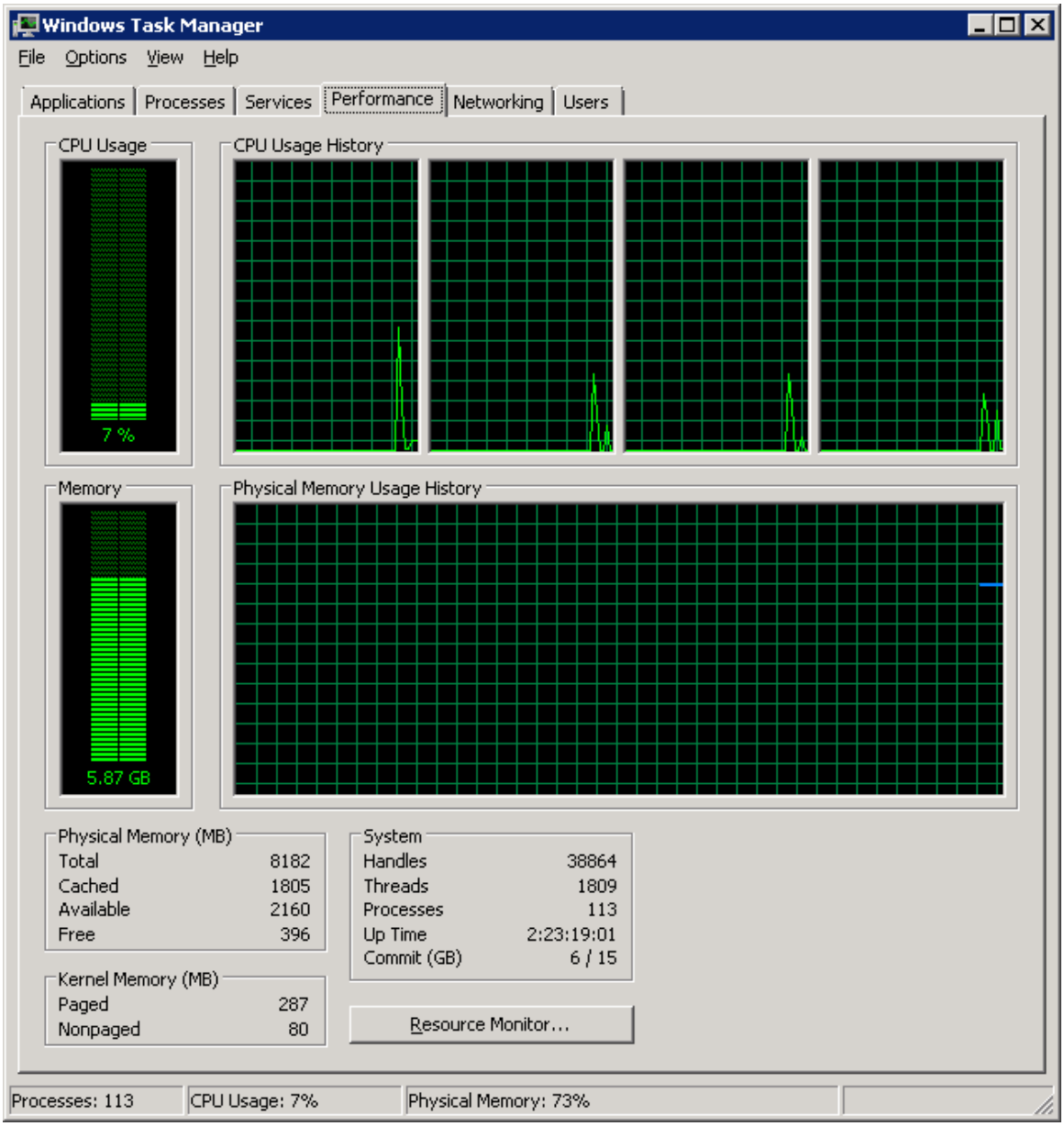
☞ Operating staff should particularly look into the event with 錯誤 or 警告 indicated in the column “類型” and report to application support team accordingly.

## 6.7.4 System Performance Monitoring in Windows 2019 Servers

Follow the steps below to invoke the graphical presentation of the current system usage information:

☞ Right-click on the task bar and select “Task Manager…”

☞ Windows Task Manager will be displayed as shown




From the tab Performance, it will show the current usage of CPU and Memory. When a high and steady line is found in CPU Usage History, it may indicate the server is in a very busy moment. If this situation keeps for a period of time, say for 5 minutes, support team should be notified.

## 6.8 Scan Virus

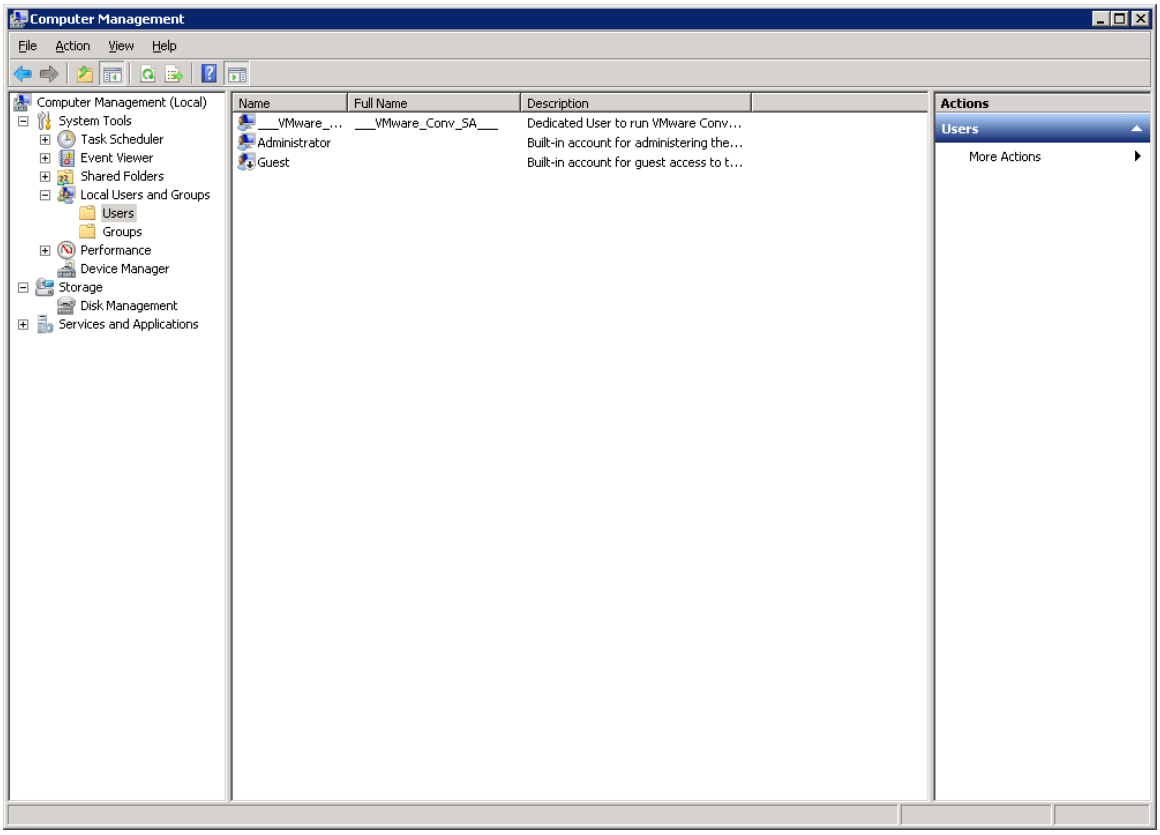
With a view to guard against virus intrusion to the system and system users, the application will perform virus scanning on data files and make sure they are clean before uploading them. The scanning activity is scheduled by group policies, as well as virus signature update.

## 6.9 Other System Operations

### 6.9.1 Change Server Password

In order to change the password of the GIS server, Report server, Image server, or Backup server, operating staff is required to perform the procedures mentioned below:

a) Log on the Server
b) Click the "Start" button in the lower left-hand corner on the screen
c) Select the icon "Administrative Tools"
d) Select the icon "Computer Management"
e) Double-click "Local Users and Groups"
f) Choose "Users"




g) Right-click on the user and choose "Set Password"
h) Enter the new password in the field "New password"
i) Repeat to input new password at "Confirm new password"
j) Click the "OK" button

# 7. Computer System Operating (Abnormal)

This section mentions the operating procedures of performing the following tasks for operating staff under the computer systems BEEO-DMS, including:

- Power Supply System Outage
- Fault Report Procedure
- First Line System Crash/Communication Fault Diagnosis

## 7.1 Power Supply System Outage

In case there is any scheduled power outage, the affected servers should be turned off properly in order to prevent unnecessary loss of data. Operating staff is required to follow the procedures mentioned in Section 6.1.1. Support Team should be notified prior to the scheduled power outage. On the other hand, users should also be informed and aware of the outage status.

Should there be the case of any unscheduled power outage, Uninterrupted Power Supply (UPS), which is connected with the servers, will cater for short-term electrical supply so as to maintain the running of the system for a short period. The affected servers should be turned off properly to prevent unnecessary loss of data. Operating staff is required to follow the procedures mentioned in 6.1.1. Support Team should also be informed of the outage status.

No matter the power outage is scheduled or not, operating staff is required to load the computer system, after the power supply has been resumed. (Refer to Section 6.3 for more details on loading the computer systems)

## 7.2 Fault Report Procedure

In order to report any faults and irregularities for BEEO-DMS, operating staff is required to follow the procedures mentioned below:

k) Operators should report any computer operational problems to Support Team for further action or advice
l) Per Support Team's advisory, they should fix the problem themselves for recurrent minor issues, or they may call support from the hardware/software vendors concerned directly.

## 7.3 First Line System Crash/Communication Faults Diagnosis

### 7.3.1 System Crash Diagnosis Procedure

System failures may be due to server network disconnection, server hardware failure (e.g. harddisk, motherboard and RAM) and/or server operating system failure (e.g. crash of AIX operating system). Following are the diagnosis procedures:

a) When a user cannot access BEEO-DMS application, the operating staff should firstly try with his/her own PC. If the problem exists only on user machine, check the network cabling for user.
b) If a number of workstations cannot access the server, the operating staff should try to ping the server by opening the Command prompt and issuing the command "ping <server-ip>". If the returned message looks like "Unreachable", "Timeout" or "Unknown host", some communication components might be mal-functioning. It is necessary to check the communication hardware (e.g. network port and switch placed near that group of users) and see whether there is any communication problem.
c) If all workstations cannot access the server, the operating staff should try to ping the server by opening the Command prompt and issuing the command "ping <server-ip>". If the returned message looks like "Unreachable", "Timeout" or "Unknown host", some communication components might be mal-functioning. It is necessary to check the communication hardware (e.g. hub or the network cards on the server) and see whether there is any communication problem.
d) Gather the findings and error messages, if any, and report them to Support Team.
e) For a major failure, where the system fails to respond to any key stroke, the operating staff should follow the procedures in Computer System Operating (Restart) (please refer to Section 8).
f) If system crash occurs, Support Team should escalate to management as well as users if necessary.

# 8. Computer System Operating (Restart)

This section mentions the Reloading procedures for the servers. This should be referred whenever that server requires restart, e.g. after applying security patch. It may be necessary to shut down the system application before proceeding to restart of server.

## 8.1 Reloading Procedures

In order to restart the servers, at first, operating staff is required to follow the procedures of checking whether there is/are any batch job(s)/backup job(s) being run in that server (please refer to Section **Error! Reference source not found.**).

After operating staff has verified that there are no batch job(s) or backup job(s) being run in the server, operating staff is required to follow the steps below in order to restart the server:

For Windows 2008 servers,

a) Shut down the system application
b) Click the "開始" button from the menu of the network operating system
c) Select "關機"
d) Select "重新開機" from the pull-down menu
e) Click the "確定" button

After the above procedures have been followed, the server is going to be restarted. After a moment, a screen requesting the Console Administrator to login will appear. Then the Console Administrator/Operating Staff is required to logon the server and follow the procedures of "Loading the Computer Systems" mentioned on Section **Error! Reference source not found.**.

# 9. Removable Media handling

This section describes the following areas:

- Tape Deck Handling
- Backup Tapes
- Magnetic Tape Failure Recovery/Reporting
- Labeling of Magnetic Tapes

## 9.1 Tape Deck Handling

To backup data form the server reliably, 3 sets of data tapes would be kept and each set would be responsible for 1 week's backup. This leads to the retention period of the backup data be 3 weeks.

Tape drive is autoloaders. Thus operating staff is only required to change the set of tapes on the 1st daily backup of the week.

## 9.2 Backup Tapes

The backup tape used by backup should possess the following characteristics:

| | |
|---|---|
| Format | LTO 5 Data Cartridge |
| Capacity | 1.5 TB or above |

## 9.3 MAGNETIC TAPE FAILURE RECOVERY/REPORTING

Backup failure can be caused by either tape drive failure or tape failure. When backup fails, operating staff is requested to report to the support team and clean the tape drive to avoid the possibility of tape drive mal-functioning. If the error still occurs, operating staff should test the tape drive with a new tape and replace the damaged tape with a new one.

To avoid mal-functioning of tape drive, tape drive is recommended to clean monthly.

## 9.4 Labelling of Magnetic Tapes

In general, backup media is recommended to be labeled to ensure the data to be backed up to the correct tape.

### 9.4.1 Backup Tapes

Backup is performed at every night.

4 tapes are grouped into 1 set of backups. 1 set of backup tapes would serve 1 week's data backup.

**Rotation Scheme**

This rotation scheme is designed to backup data for 3 weeks retention period.

| | Monday | Tuesday | Wednesday | Thursday | Friday | Tape Pool |
|---|---|---|---|---|---|---|
| Week 1 | Full | Incremental | Incremental | Incremental | Incremental | LTO000001 - 4 |
| Week 2 | Full | Incremental | Incremental | Incremental | Incremental | LTO000005 - 8 |
| Week 3 | Full | Incremental | Incremental | Incremental | Incremental | LTO000009 - 12 |

A total of 12 LTO 5 Data Cartridge will be required to implement the above backup scheme.

## 9.5 Off-Site Tape Arrange

1 set of weekly backup tapes should be stored off-site (Siu Ho Wan data center). It is suggested to bring the whole set of the weekly tapes to off-site weekly and call back when the set of tapes which are going to be used.

- End of Document -