ISSUER INFORMATION *feed* SERVICE ("IIS")

Transmission Specification

Version no.: 3.10

Date: 22 February 2021

Modification History

Version	Date	Description and reason for modification
1.0	15 May 2002	First Distribution Issue
1.1	23 July 2002	There are 3 major changes. ➢ The password encryption algorithm is changed from RSA public key cryptography to triple-DES symmetric key cryptography. This affects messages INITRESP, LOGONREQ and CHNGPWDREQ. ➢ The Vendor identity is removed from CHNGPWDREQ message since the session key generated is used as identity in the whole session. ➢ The signature in headline delivery message (UPDATEHEADLINE and RECVYHEADLINE) is removed. The RSA public key for signing embedded in message LOGONRESP is also removed.
1.1.1	29 Oct 2002	Lengthen the user id field from 8 to 10
1.2	29 Oct 2002	Update announcement types
1.3	9 July 2003	1. Change name of specification from Message Interface Specification to Transmission Specification to be consistent with the name used in documents of other information services and Vendor agreements 2. Clarify that entity of system owner belongs to the Exchange instead of HKEx so that we could maintain consistent system and Vendor agreement approach across all information services. 3. Change from Vendor to Information Vendor to be consistent with IIS Testing Procedure and other system specifications 4. Clarification on the number of lines/connections required under standard configuration and non-standard configuration. The IIS Vendor agreement requires Vendor effect the no. of connections as per requirement of the Transmission Specification. 5. Clarification on the number of the Exchange connection ports provided for Information Vendor connections. The IIS Vendor agreement charges Port Fees according to number of connection ports specified in the Transmission Specification. 6. Removal of SDI News which is no longer available after implementation of DI (Discloser of Interest) Project initiated by SFC on 1 April 2003.
1.4	25 July 2003	1. Add Expiry Date into DescriptiveMetaData 2. Add Business Hours 3. Add Non-standard Connection
1.5	25 Nov 2003	1. Change the expiry date to be the last day for the dissemination of the news instead of the first day for not disseminating of the news. 2. Modify announcement types
1.6	10 Jan 2004	Add MISC announcement types
1.7	7 May 2004	Add Announcement Type “15250” – Proxy Form into MAIN Board
1.8	30 June 2004	Add Announcement Type “15250” – Proxy Form into GEM
1.9	4 Aug 2004	1. Change to provide only 1 day (instead of 2 days) online news for vendors 2. Clarification on connection ports
1.10	4 Jan 2005	Revise the documentation for the purpose of clarification on appropriate areas. There is no technical change. 1. Add note for download of current day news message after successful logon to IIS (P.9). 2. Clarify the format of modifying the <DescriptiveMetadata> tag for multiple items (P.24 and P.48). 3. Clarify the Appendix C for Encryption & Decryption Algorithms on the use of Microsoft CryptoAPI in IIS (P.44).
1.11	08 Aug 2006	Implementation of No-Paid-Ad Project in first Half 2007 1. Change of IIS Operation Hours (section 2.2)

Version	Date	Description and reason for modification
		2. Clarify the possible behavior if duplicate logon is detected (sections 2.4.1, 4.1.1) 3. Add "Allocated Bandwidth" (section 3) 4. Implement IIS Secondary Site for disaster recovery purpose. (section 3). 5. Add "Contingency Arrangement" (section 3.8) 6. Removal of CONTINGENCY type for UPDATEHEADLINE tag (section 4.2, 5.2.1 & Appendix A) 7. Add <Subject Name> tags to provide file content description for multiple attachment news (sections 4.2.1, 5.2.1 & Appendix A) 8. Change of STATUSREQ interval (sections 2.4.4, 4.3.1) 9. Update <DescriptiveMetadata> element to (a) add Stock Name, (b) include updated news information – Headline Category (included both Tier 1 and Tier 2 News Categories representing the primary headline and secondary headlines input by the listed issuers), and (c) remove the announcement type. (section 5.2.1 appendix F) [The existing 'headline" will carry the "Freetext" information, being the title of the announcement input by Listed Issuers.] 10. Increase the field length of ReqId from "999" to "99999". (Section 5) 11. Change of field format of NewsItemId from "NNNNN" to "[X]*". (Section 5.2) 12. Introduction of headline category amendment and amendment of CANCELLED news mechanism. (section 5.2.1) 13. Section 6 – "Security and Control" added. 14. Clarify the meaning of <NoOfContentItem> tag and <DataContent> tag (section 5.2.1). 15. Clarify the exceptional handling when "Headline Sequence Number" is out of sequence (section 4.1.6). 16. Clarify the error code 90007 in Appendix E on Error Code Definition. 17. Add error code 90014 in Appendix E on Error Code Definition.
2.0	3 Nov 2006	IIS Redevelopment (tentative rollout in late Q1/early Q2 2007): 1. Replace message-based attachment delivery by file-based attachment retrieval through implementation of IIS File Transfer Servers. (section 2, 4, 5, Appendix A, D, E) 2. Update on Line protocol and network structure for new File Transfer Servers (section 3)
2.0a	30 Nov 2006	1. Update on handling of headline amendments (section 5.2.1) 2. Updates on Headline Categories (Appendix F)
2.0b	22 Feb 2007	1. Update the Amend message scenarios in section 5.2.1
2.0c	28 Feb 2007	1. Update the English description of Tier 1 code 80000 and Tier 2 code 17850. 2. Update the Chinese description of Tier 2 code 19150 & 19600
2.0d	22 Mar 2007	1. Add Contingency Arrangement in Section 3.8 and respective guideline for reading the CD-ROM in Appendix H. 2. Update that dual live connections become the mandatory configuration requirement for IIS. 3. Update the description of Tier 2 code 12350
2.0e	4 Jun2007	1. Update the English and Chinese description of Tier 1 code 90000 (Appendix F)
2.0f	15 Jun2007	1. Remove the Tier 1 code of 60000 "Headline Category – [Document type to be assigned]" (Appendix F)
2.0g	18 Jun 2007	2. Update the English and Chinese description of Tier 1 code 90000 (Appendix F)

Version	Date	Description and reason for modification
2.0h	23 Jul 2007	1. Update the multiple file handling logic
2.1	23 Jun 2008	1. Supplement for full recovery behavior in section 2.4.3 2. Requirement for IIS Certification Test in section 2.5 3. Minimum bandwidth and TCP Receive Buffer Size requirement in section 3 4. Automatic reconnection requirement in section 4.1.6 5. Add new Headline Category codes in Appendix F
2.2	28 Nov 2008	1. Add new Headline Category codes in Appendix F 2. Remove the word “Headline Category” and ”標題類別” for description of Tier 1 Headline Category Code in Appendix F
2.3	20 Dec 2010	1. Add Section 2.6 for “Technical Requirements for Direct Connection Vendors”
2.4	12 Jan 2011	2. Add new Headline Category code in Appendix F
2.5	17 Jan 2011	*14.* Update date folder structure of news attachment in Appendix H – Guideline on Reading the CD-ROM provided under Contingency Arrangement
2.6	18 Nov 2011	*14.* Add Tier 2 code 15000, 12951, 12952, 12953, 12954, 12955, 12956, 12957, 23500
2.7	9 Feb 2012	1. Add Tier 1 code 55000
2.8	30 Nov 2012	1. Add Tier 2 code 17960, 19750 2. Amend Tier 2 code 19550
2.9	19 Dec 2012	1. Add Tier 2 code 12958 & 40400 2. Amend Tier 1 code 40000 3. Amend Tier 2 code 17100, 17150, 25100 & 25200
3.0	17 Jul 2013	1. Add Tier 1 code 91000 2. Add Tier 2 code 91100 3. Add Tier 2 code 91200
3.1	6 Feb 2014	1. Modify Tier 2 code 19450, 19500 2. Add Tier 2 code 12959, 19760, 19770, 19780, 19790, 19800, 19810, 19820, 19830, 19840, 19850, 19860
3.1-1	6 Mar 2014	1. Updates on testing hours arrangement in section 2,2 2. Modify Tier 2 code 19450, 19500
3.2	13 Feb 2015	1. Add Tier 2 code 13750 & 13800 2. Amend Tier 2 code 18100 & 26200
3.2-1	16 May 2016	1. Add Tier 1 code 81000
3.2-2	23 Jun 2016	1. Various new Tier 2 codes in section F 2. Restructure of Tier 1 and Tier 2 codes
3.3	15 Feb 2018	Update the Chinese name of Tier 1 code 53000 and Tier 2 code 15600
3.4	29 Mar 2018	Update EXN as headline category Tier 1
3.5	1 Feb 2019	<table><tr><th>Effective Date</th><th>Changes</th></tr><tr><td>1 Mar 2019</td><td>Update Chinese and English name of Tier 1 code 10000 and Tier 2 code 13550</td></tr></table>

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<tr><td>3.6</td><td>11 Apr 2019</td><td>
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<tr><th>Effective Date</th><th>Changes</th></tr>
<tr><td>14 July 2019</td><td>1. Update Section 5.2.1, Appendix H to indicate the news headline and attachment are in Unicode
2. Update Section 4.1.3 and Section 6 to specify the password requirement</td></tr>
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<tr><td>3.7</td><td>2 Jul 2019</td><td>
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<tr><th>Effective Date</th><th>Changes</th></tr>
<tr><td>Immediate</td><td>1. Appendix C – remove obsolete link reference to Triple-DES link</td></tr>
<tr><td>14 July 2019</td><td>1. Appendix G – include additional file extensions</td></tr>
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<tr><td>3.8</td><td>22 Jul 2020</td><td>
<table>
<tr><th>Effective Date</th><th>Changes</th></tr>
<tr><td>Immediate</td><td>1. Update Section 3.8 Contingency Arrangement – replacement of CD by provision of a download link
2. Update Appendix H Guideline on reading the IIS files provided under Contingency Arrangement – align with updated section 3.8 and update the sample details</td></tr>
<tr><td>2 Aug 2020</td><td>1. Add Tier 2 Code 12050</td></tr>
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<tr><td>3.9</td><td>31 Jul 2020</td><td>
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<tr><td>9 Aug 2020</td><td>1. Update Tier 2 Code 26850</td></tr>
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<tr><td>3.10</td><td>22 Feb 2021</td><td>
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<tr><th>Effective Date</th><th>Changes</th></tr>
<tr><td>Immediate</td><td>1. Remove obsolete xsd element UPDATEATTCHMENT (Appendix A)
2. Add back the detail of Triple-DES (Appendix C)</td></tr>
<tr><td>1 Mar 2021</td><td>1. Add Tier 2 Code 76100, 76200, 76300, 76400, 76500, 76600, 76700 (Appendix F)</td></tr>
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TABLE OF CONTENT

1. Introduction

1.1. Overview

Issuer Information feed Service (IIS) is a system of the HKEX Information Services Limited ("HKEX-IS") which distributes issuer information that includes Listed Company news, Exchange news of Stock Exchange of Hong Kong Limited ("the Exchange") and issuer documents. This document provides message definition and application protocol between IIS and IIS subscribers /distributors/ information vendors (hereunder collectively abbreviated as "Vendor"). It also describes the error handling and recovery procedure.

The intended reader of this document is the technical personnel of a company that has subscribed for this information service. The technical personnel should acquire basic knowledge of cryptographic technology and XML (Extensible Markup Language). This specification provides sufficient information for Information Vendors to develop their own systems to receive issuer information from IIS.

1.2 Document Structure

Section 2	*System Overview* This section describes the scope, constraints and application protocol of IIS.
Section 3	*Line Protocol* This section describes the communication means between IIS and system of the Vendor
Section 4	*Detailed Message Format* This section describes the message format in details
Section 5	*Detailed Message Processing and Application Protocol* This section describes the message processing and application protocol in details
Appendix	This section contains several subsections for detailed implementation. It includes: *XML schema* *Base64 encoding and decoding algorithms* *Cryptography in IIS* *An example of Message Flow Diagram* *Error Code Definition* *Subject Code within Descriptive Metadata* *MIME Type – File Extension Mapping*

1.3 Document Convention

[data format] variable to be substituted which compiles with data format

data format includes : X – character
9 – [0-9] numeric value
N – [0-9] character included leading zeros.
* -- zero or more
+ -- one or more

For example:

[X]* refer to a string including empty string: "123", "test"
[X]+ refer to a string with at least 1 character.
[9]*3 refer to a numeric value 0-999
[N]*5 refer to a numeric string 0000 - 99999

2. System Overview

2.1 Scope

IIS provides issuer information which includes real time news and issuer document to Information Vendors and this covers the following categories.

1. Exchange news
2. Listed Company news
   - Main
   - GEM
3. Issuer documents

All the news and issuer document collected for distribution in IIS are generally named as news in the subsequent sections of this document.

2.2. IIS Operation Hours

IIS operates during Securities Market trading days from Monday to Friday and day immediately before the first trading day of any given calendar week. Specifically, IIS operation hours are as follows:

2.2.1 Trading Days

a) System Hours:

- Ready for Logon at 05:30
- System Shut Down at 00:00 (next day)

IIS would provide one day online news headline and 2 business days' online news attachments to Vendors. After IIS System is restarted in the morning, only current day's news and news attachments for current day and the business day before will be available (i.e. from 0:00 onwards)

b) Business Hours (with news / document distribution):

- Mon - Fri 06:00 - 23:00

2.2.2 Day (including mid-week public holiday) immediately before the first trading day of any given calendar week

a) System Hours:

- Ready for Logon at 17:30
- System Shut Down at 21:00

IIS would provide one day online news headline and 2 business days' online news attachments to Vendors. After IIS System is restarted in the morning, only current day's news and news attachments for current day and the business day before will be available (i.e. from 0:00 onwards)

b) Business Hours (with news / document distribution):

- 18:00 – 20:00

All non-IIS operation hours, i.e. any time outside a) and b) in 2.2.1 & 2.2.2 above, will be reserved for maintenance.

c) Testing Hours (with news / document distribution):

Testing data will be disseminated on demand during weekends. Vendors should ignore testing data from SAT 06:00- SUN 12:00 regularly. An Illustration for April 2006:

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2 B	3 A	4 A	Ching Ming Festival 5 B	6 A	7 A	8
9 B	10 A	11 A	12 A	13 A	Good Friday 14	15
16	Easter Monday 17 B	18 A	19 A	20 A	21 A	22
23 B	24 A	25 A	26 A	27 A	28 A	29
30	Labour Day 1 B	2 A				

Note:
Saturdays, Sundays and holidays are shaded in grey.
IIS will be brought up on Days marked with “A” and “B” which represents:
A days – follow the schedule stated in section 2.2.1, being Trading days
B days – follow the schedule stated in section 2.2.2, being Day (including mid-week public holiday) immediately before the first trading day of any given calendar week.

2.3 Information Delivery

News is composed of two parts, headline and attachment. Once the Vendor has logon to IIS, updated and subscribed headline is delivered to the Vendor automatically. If the subscription includes attachment, the attachment can be retrieved by the Vendor upon request through FTP protocol (RFC 959, http://www.ietf.org/rfc/rfc0959.txt)..

Each headline contains unique headline identity, news information, e.g. category, date/time in ISO 8601 format, language in ISO language code (ISO639-ISO3166); with/without information of each associated attachment, e.g. unique attachment identity “Href”, size in bytes, hash value using Message Digest 5 algorithm (RFC 1321 of IETF). The Vendor can then retrieve the attachment from IIS File Transfer Server and the integrity of the attachment can be verified using Message Digest 5 algorithm against the hash value coming with the headline.

The headline is in XML format while they are devised with reference to NewsML Version 1.0 of International Press Telecommunication Council. The functional specification of NewsML Version 1.0 was updated on 24th October 2001. It is available in public Internet, http://www.iptc.org. The specification can be found with this URL https://www.iptc.org/std/NewsML/1.0/

Additional XML tags are defined to enclose headline, control flow, command and status response instructions and the final XML form is called message block. These message blocks are transferred over TCP/IP session that has been established between IIS and Vendor’s terminal.

More detailed descriptions on the messaging interface are given in the following sections.

The message block is classified into three types, command/response, data and control flow. It takes the following form.

```
<?xml version=”1.0”?>
<NDSML>
   <MsgHeader>
      <MsgDate>.....</MsgDate>
      <MsgID>.....</MsgID>
      <MsgType>.....</MsgType>
  </MsgHeader>
```

```
  <[MsgID]>
      ......
  </[MsgID]>
</NDSML>
```

Tag	Format	M/O	Occurs	Description
NDSML	Complex	M	1	IIS Message root tag
MsgHeader	Complex	M	1	Message header information
MsgDate	CCYYMMDDT24HHMISS[+-]NNNN	M	1	Message delivery date time
MsgID	[X]*20	M	1	Message code/Command
MsgType	[NDScmd/NDSdata/NDSctrl]	M	1	Message Category code
[MsgID]	[X]*	M	1	Message ID

The following table summarises the types of message used in IIS.

Message category	Message type	Message_code
Command/response	NDScmd	INITREQ INITRESP LOGONREQ LOGONRESP LOGOFF CHNGPWDREQ CHNGPWDRESP FULLRECVYREQ PARTRECVYREQ RECVYRESP RECVYCOMPLETE PERMISSIONDROP
Data	NDSdata	UPDATEHEADLINE RECVYHEADLINE
Control flow	NDSctrl	STATUSREQ STATUSRESP

2.4 Application Protocol

The Application protocol covers the following areas.

- Logon and Logoff
- Normal transmission
- Error recovery
- Message handshake

The first three items fall into command/response and data categories while the last one belongs to control flow category.

The following provides an overview to the protocol used in the application. Please refer to the detailed message processing and application protocol section for a detailed description of each kind of application messages.

2.4.1 Logon and Logoff

Having established the TCP/IP connection with IIS, the Vendor sends INITREQ command to IIS. IIS responds with INITRESP response together with logon information and session key encrypted by IIS symmetric key using Triple-DES algorithm (see Appendix C for details). The Vendor makes LOGONREQ command with Vendor identity and password encrypted by the session key using Triple-DES algorithm. Having verified the Vendor information, IIS gives back LOGONRESP response together with logon response information. It should be noted that each Vendor identity can only be used for one connection with IIS while duplicate logon is guarded in IIS. Once duplicate logon from same Vendor (Determined by

connection using same Vendor identity) is detected by IIS, all connections using the same Vendor identity will be dropped. If the Vendor fails to logon to IIS for 9 times (subject to change by HKEX-IS), its account is de-activated. The Vendor must contact HKEX-IS or its dedicated agent in order to access the service again.

When the Vendor would like to stop receiving updated news, the Vendor can issue a LOGOFF command to inform IIS. However, if the Vendor would like to receive updated news again, the Vendor must issue INITREQ and then LOGONREQ commands again. If the Vendor system is closed without sending LOGOFF command, IIS will discover the disconnection based on the message handshake protocol or TCP/IP layer whichever comes first.

2.4.2 Normal Transmission

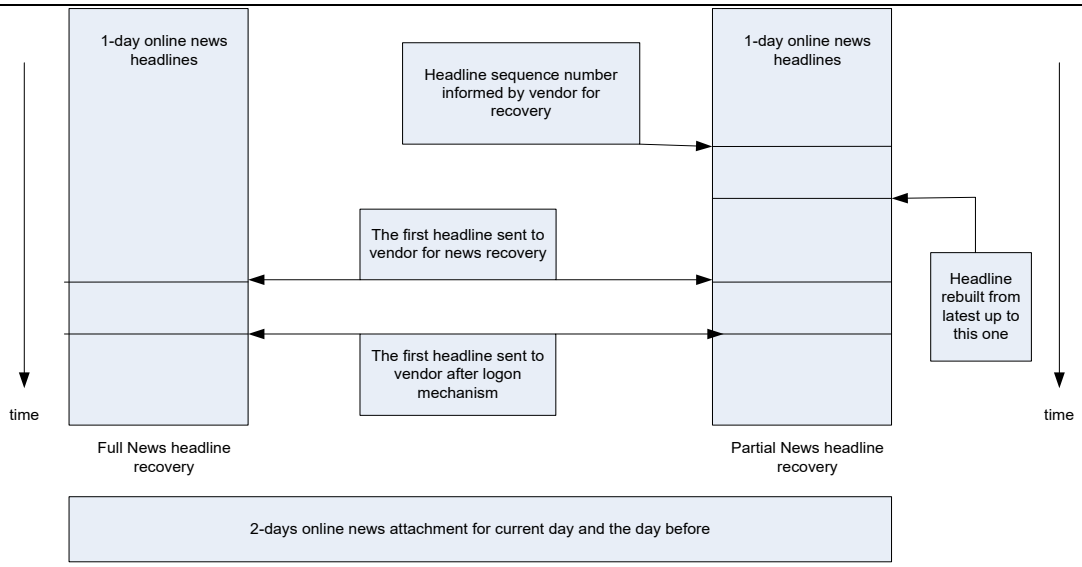
After the Vendor terminal has gone through logon process, subscribed headline just received from IIS is delivered to it using unsolicited data response UPDATEHEADLINE while this headline does not contain attachment information. If the subscription includes an attachment, the Vendor receives another headline with attachment information. Each headline sent from IIS no matter which subtype it belongs to (to be described in later section) is assigned a sequence number and this sequence number "Headline Sequence Number" is used for partial headline recovery. However, this sequence number may not be in consecutive sequence depending on what kinds of news the Vendor has subscribed.

For each attachment, the Vendor sends retrieval request with unique attachment identity to assigned IIS File Transfer Server(s) through FTP protocol. Having acquired the attachment, the Vendor terminal can calculate the hash value of the attachment using Message Digest 5 algorithm. This calculated hash value should be verified against the one coming with the associated headline. If for some reasons the Vendor terminal gets a corrupted/incomplete attachment, the Vendor should repeat the attachment retrieval process again.

Vendors are recommended to confine the number of concurrent FTP retrieval sessions to be no more than 10 at the same time. Excessive concurrent FTP retrievals will slow down he overall performance and prolong the retrieval time for smaller attachments.

2.4.3 Error Recovery

The Vendor can initiate a recovery request to recover up to 1 day's online news headlines and 2 business days' online news attachments from IIS. IIS can rebuild the headline and allow Vendor to retrieve the associated attachment from dedicated IIS File Transfer Server through FTP protocol. Two levels of recovery are provided for the Vendor. Firstly, a recovery of 1 day's online headline request can be made whilst 2 business days' online news attachments can be recovered by repeating the attachment retrieval process from IIS File Transfer Server. The recovered headline is sent to the Vendor terminal in a last-in-first-out order. Secondly, partial online headline recovery can be requested. The Vendor needs to inform IIS the last news it kept within its own system (identified by the sequence number of headline) and IIS will rebuild the successive headlines also in last-in-first-out order. It should be noted that the most recent news received from IIS is also sent to the Vendor at the same time. The following diagram depicts the news recovery mechanism.



For full recovery, the Vendor should send FULLRECVYREQ command to IIS. IIS will accept FULLRECVYREQ only right after the logon request completed successfully. IIS will ignore any FULLRECVYREQ once news has been dissemination after Vendor logon. This feature is designed to avoid unnecessary full recovery requests made by vendors which may affect their system performance. For partial recovery, the Vendor should send PARTRECVYREQ command with last "Headline Sequence Number" to IIS. In both cases, IIS will respond with RECVYRESP with the total number of recovery headlines to be sent to the Vendor. Then, IIS will rebuild the recovery headline for the Vendor using unsolicited data response RECVYHEADLINE. After all recovered headlines are sent, IIS sends status response RECVYCOMPLETE to the Vendor.

Due to the long lead time required for full news recovery during the operation hours, direct connection IIS vendors can only request one full news recovery through a single connection session. A re-connection is required for additional full news recovery. Vendors are advised to perform full news recovery on one of the dual live connections, but not both at the same time.

2.4.4 Message Handshake

Status request feature is available to improve the communication fault detection time. Thus, when no traffic is detected from the Vendor terminal for 120 seconds (subject to change by HKEX-IS), IIS sends STATUSREQ command to the Vendor terminal and expects Vendor to respond with STATUSRESP. If the Vendor terminal does not respond to the status request for 120 seconds, IIS would issue STATUSREQ command again. If IIS does not get any response, it would disconnect the established connection with that Vendor terminal. Vendor can also issue this status request to detect if IIS is still running when there is no traffic from IIS for 60 seconds.

2.5 IIS Certification Test

Vendors who choose direct connection with IIS system have to pass the IIS Certification Test according to the requirements as set out in the IIS Certification Test Procedures (This document will be provided by Exchange upon IIS service application) before they will be granted the IIS license. The IIS Certification Test will cover all requirements set out in this document. Apart from the IIS Certification Test, direct connection IIS vendors must meet all the requirements as set out in the IIS Transmission Specification.

2.6 Technical Requirements for Direct Connection Vendors

1. Direct connection vendors must meet all the requirements as set out in this IIS Transmission Specification.

2. The system of the direct connection vendors must have sufficient capacity to process the Exchange's news data with minimum latency. To achieve minimum latency, vendors are advised to set the TCP Receive Buffer Size to 64K bytes and to allocate dedicated server for interfacing with the IIS host system.)

3. Direct connection vendors must ensure that lines connecting to IIS system meet the minimum bandwidth requirement as set out by HKEX-IS from time to time. (The minimum bandwidth requirement is at present 2 Mbps.)

4. Direct connection vendors must have dual live connections with IIS.

5. Direct connection vendors must be able to detect line failure automatically and reconnect within 5 minutes. Such requirement will be included in the IIS Certification Test for new direct connection IIS vendors and will be tested once a year in the market rehearsals arranged by HKEX-IS. The results of the market rehearsals will be published on the HKEX website for public reference.

6. Due to the long lead time required for full news recovery during the operation hours, direct connection IIS vendors can only request one full news recovery through a single connection session. A re-connection is required for additional full news recovery. Vendors are advised to perform full news recovery on one of the dual live connections, but not both at the same time.

7. Direct connection vendors have to pass the Certification Test according to the requirements as set out in the IIS Certification Test Procedures before they are approved to redistribute IIS news.

3. Line Protocol

Item	Description
Mode of transmission	IP-based Network
Communication line speed	2Mbps, 3 Mbps and 4Mbps available*
Communication protocol	TCP/IP (port number 20, 21 for file transfer & 6800 for IIS headline and command messages)
Allocated Bandwidth	- 128Kbps for IIS headline and command messages - Available bandwidth for Attachments depends on the bandwidth of the line subscribed by the Vendor for file retrieval
TCP Receive Buffer Size	64K Bytes*

* The system of the direct connection IIS vendors must have sufficient capacity to process the Exchange's news data with minimum latency. To achieve minimum latency, vendors are advised to acquire a minimum 2Mbps line bandwidth and 64K Bytes TCP Receive Buffer Size to all dedicated servers for interfacing with the IIS host system.

3.1 Number of Connections and Connection Requirement

It is a requirement that Vendors should have two connections or links configured on their systems. Vendors should at all times ensure that all links are ready. The standard configuration contains dual live connections. Both links to IIS production system could receive live data transmission. However, IIS will operate the two links separately as if they were two primary links connected to two independent systems.

3.2 IIS Connection Ports in the Primary Site

An IIS Connection Port in Primary Site contains one set of IIS server IP addresses:
- an IP address of IIS Data Delivery Server for headlines and command messages
- an IP address of IIS File Transfer Server for attachment file retrieval through FTP

For each Vendor identity, it is given two sets of IP addresses representing one primary and one secondary connection ports on the IIS Primary production system ("the Connection Ports"). If Vendor found that no TCP/IP connection can be established after 3 times of retry on each IP address, it should stop its system and find out if there is any problem with the physical connections.

Under the standard configuration of dual live connections (with two live feeds), IIS will provide two production Connection Ports and allow each Vendor to maintain two logon sessions using two different Vendor identities.

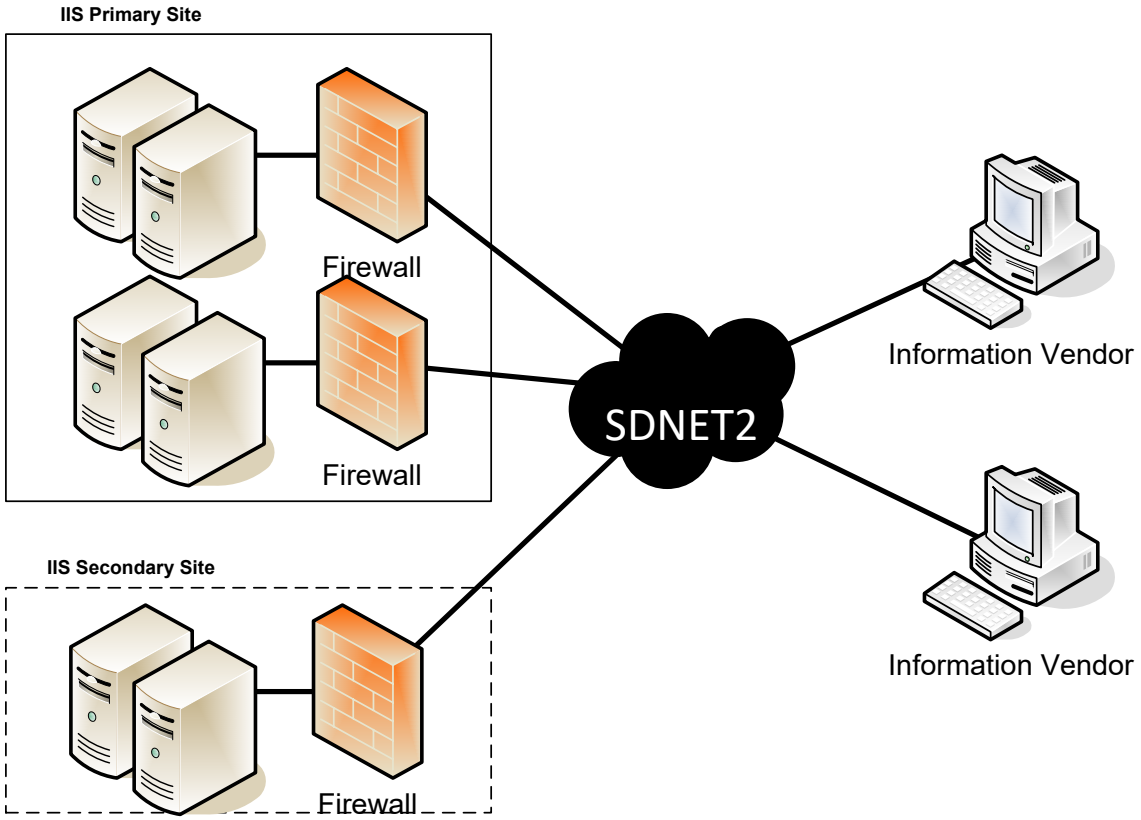
3.3 IIS Disaster Recovery Port in the Secondary Site

In order to increase the availability of IIS, a Secondary Site for IIS is introduced. Each Vendor will be provided with a single Disaster Recovery Port though there are dual live connections in the Primary Site. A Disaster Recovery Port contains one set of IIS server IP addresses:
- an IP address of IIS Data Delivery Server for headlines and command messages
- an IP address of IIS File Transfer Server for attachment file retrieval through FTP protocol

When site failover is triggered, Vendor will just need to switch their connections from the Primary Connection Ports to the Disaster Recovery Port. Instead of using the connection ports for the Primary production system, Vendor had to use the Disaster Recovery Port in the Secondary Site. An additional Disaster Recovery Port could be arranged but is subject to additional charges.

3.4. Network Diagram

Network Diagram for Dual Live Connections Configuration



3.5 Line Connection Failure

The connection ports of the Primary production system are expected to be used for normal transmission. If there is a failure on either connection, the information vendor can attempt to reconnect to IIS using the same connection port on the Primary system.

Information Vendor is recommended to detect connection status in the TCP level so that link failures can be identified.

Information Vendors are requested to implement auto-detection of line failure and auto-reconnection of its production line. This would help to shorten blackout time and ensure continuity of news transmission.

3.6 Failure of the IIS System in Primary Site

If IIS system in Primary Site fails, IIS site failover will be triggered. The operation will take approximately 30 minutes to fail IIS over to the Secondary Site and ready for news dissemination. After failover to Secondary Site, IIS would be in a state which is ready to perform full news recovery. Upon receiving notification from HKEX-IS, Vendor will be required to connect to IIS Secondary Site via the Disaster Recovery Port.

Right after switching from the Primary site to the Secondary Site, Vendors should perform a full recovery to make sure their system will not miss any news that may be published during the failover period.

3.7 Guidance for Vendor during IIS Failover

Pre-requisites for failover to the Secondary Site:

- Disaster Recovery Port in the Secondary Site is ready;
- User ID and password is ready (Any new password change on the failover day will be lost and old password is expected to be used after failover to the Secondary Site);
- Information vendors should perform their housekeeping wherever applicable. i.e. to record the headlines or attachments which have yet been completely received before failover.

Steps for reconnecting to the Secondary Site of IIS:

- Attempt the Disaster Recovery Port in Secondary Site;
- Issue logon request and complete the logon process as usual;
- Issue full recovery request;
- Start receiving full set of news headlines (reverse chronological order with latest news transmitted first) for current day. Vendor should note that the following special handling is required:
  - The sequence number for news after site failover will start from 1. It also applies to failover from the Secondary to Primary Site as well;
  - The Vendor's software should check if there is duplication of headlines received. It can be done by checking the Headline <ProviderID>, <DateID> and <NewsItemId> (refer to section 5.2.1 for details). The Vendor's software should avoid sending attachment retrieval request for any news that was already retrieved completely before otherwise it will introduce unnecessary loading on the IIS File Transfer server.

3.8 Contingency Arrangement

If IIS fails in the Primary Site and the Secondary Site cannot be brought up for service continuity, vendors will be informed by email of the service disruption.

If IIS can be resumed before mid-night of failure day, vendors will be advised to connect to IIS for service recovery.

If IIS cannot be resumed before mid-night of failure day, the contingency arrangement will be triggered. A download link of a file with all issuer documents stated at section Main Broad and GEM Broad Headline Category of appendix F released on the HKEXnews website on the failure day, together with a CSV mapping file will be provided to IIS Vendors in the morning of the following business day. Please refer to the Guideline on reading the IIS files provided under Contingency Arrangement as described in Appendix H.

The resumption of normal services will be communicated by e-mail to Executive, Technical and Emergency Contacts of IIS Vendors.

4. Detailed Message Processing and Application Protocol

There are three kinds of message category, command/response, data and control flow. The command instructions are sent from the Vendor to request services of IIS, such as request for connection and data recovery. Data message category is focused on data contents delivery, i.e. headline and attachment. Headline is delivered in an unsolicited way whereas attachment is sent on request. The third type, control flow, is an interactive way of communication. IIS can detect if the Vendor system is up and running and vice versa.

4.1 Command/Response Messages

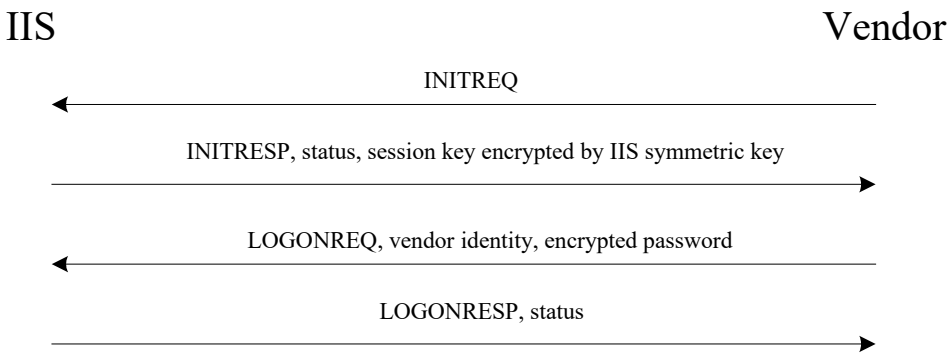
These messages are used for connection request and data recovery. The "MsgID" is among one of the following values.

Message code	Message originator	Description
INITREQ	Vendor	Request to communicate with IIS
INITRESP	IIS	Asking the Vendor to send Vendor identity and encrypted password
LOGONREQ	Vendor	Sending Vendor identity and encrypted password for authentication
LOGONRESP	IIS	Responding if the service is granted or denied to the Vendor
LOGOFF	Vendor	Disconnecting from the existing service
CHNGPWDREQ	Vendor	Request to change the password
CHNGPWDRESP	IIS	Responding if the change of password instruction is successful
FULLRECVYREQ	Vendor	Full headline recovery
PARTRECVYREQ	Vendor	Partial headline recovery
RECVYRESP	IIS	Headline recovery response
RECVYCOMPLETE	IIS	Notification of the completion of headline recovery
PERMISSIONDROP	IIS	It is a notification to Vendor that the Vendor identity cannot be used to get service from IIS

For the Request/Response messages, there is one "ReqID" attribute at both request/response "MsgID" tag to associate the response message to the request message. Vendor should issue the request command with a unique "ReqID" assigned that IIS will respond with the same "ReqID". This can be achieved by an incremental sequence number.

4.1.1 Logon

There are two steps during logon process as shown after the Vendor establishes TCP/IP connection with IIS. If the connection cannot be established with the primary address, the secondary address should be tried.



Firstly, the Vendor initiates INITREQ request to IIS. IIS responds with INITRESP response message to the Vendor. The following response status is found.

Response status	Additional information/Error Code	Description
SUCCESS	Session key encrypted by IIS symmetric key using Triple-DES algorithm which is described in Appendix C	Successful status with session key for password encryption in next step
FAILURE	INVALID_MESG	Invalid Message Format
FAILURE	SERVICE_NOT_AVAILABLE	Service not available

The session key is used to protect sensitive information, e.g. password, transferred between IIS and Vendor. This key in big-endian format is encrypted by IIS symmetric key using Triple-DES algorithm and then it is transformed to Base64 format. For details, please refer to Appendix C. The IIS symmetric key is distributed to each Vendor. The session key is invalidated after either the Vendor issues LOGOFF command or either one of parties is disconnected.

Secondly, the Vendor sends LOGONREQ request with Vendor identity and encrypted password with session key using Triple-DES algorithm to IIS (please see Appendix C for details). The encrypted password should be transformed to Base64 format before transmission. IIS will respond with LOGONRESP and logon status to indicate whether the service is granted or denied. After successful logon, the Vendor can request other services such as change of password and headline recovery while updated and subscribed headline is delivered to the Vendor automatically. Thus, if the Vendor requests these types of service before the logon process, IIS will respond with failure status code. The following response status for LOGONRESP can be found.

Response status	Additional information/ Error Code	Description
SUCCESS	Kind of services (HDL or HDL AND ATT) Subscribed package (A or B or C)	Successful status indicating what kind of services is granted (headline or headline and attachment)
FAILURE	INVALID_MESSAGE	Invalid message format
FAILURE	INCORRECT_SUBSCRIBER	Incorrect Vendor identity or password
FAILURE	PERMISSION_DROP	Operation not allowed because permission is dropped
FAILURE	DUPLICATE_LOGON	A connection has been established for same Vendor identity and password. All connections from the same Vendor Identity will be dropped.
FAILURE	SERVICE_NOT_AVAILABLE	Service not available

If the Vendor fails to log on to IIS for 9 times, the account is de-activated. “PERMISSION_DROP” status response message is returned on 9th time of failure. The Vendor must contact HKEX-IS or its dedicated agent in order to access the service again.

If response message of “FAILURE” with “DUPLICATE_LOGON” error code is received, the Vendor should initiate connections to IIS again.

The Vendor can choose to initiate a full or partial recovery request after successful logon to IIS in order to ensure there is no outstanding headline pending received. For partial headline recovery, the IIS may respond RECVYRESP with Error code = NEWS_NOT_FOUND. Under this situation, there are no outstanding headlines in IIS and the vendor need to send FULLRECVYREQ command back to IIS for retrieving current day’s outstanding headline.

4.1.2 Logoff

When the Vendor does not want to receive updated headline and to get any kind of service from IIS, the Vendor terminal can issue LOGOFF request to inform IIS about this. However, IIS would still issue

STATUSREQ command to find out if the Vendor terminal is running. If the Vendor does not respond this command twice, IIS will drop the connection. When the Vendor would like to communicate with IIS, the Vendor must issue INITREQ and then LOGONREQ commands again. When TCP/IP connection is still maintained, another Vendor using same pair of Vendor identity and password is not allowed if the Vendor does not issue LOGOFF command. "Duplicated logon" is resulted for that new connection.

Any invalid message format for LOGOFF command will be discarded in IIS. As a result, updated headline is still sent to the Vendor. If the Vendor does not issue LOGOFF command for service disconnection before dropping the TCP/IP connection, IIS will discover the disconnection via the STATUSREQ. It might take about two minutes for IIS to find out if the connection is actually gone, however, this elapse time is only indicative and may vary accordingly depending on different Vendor's setup.

Once IIS acknowledges the successful status of LOGOFF command, the session key created during logon process is invalidated. The Vendor must issue INITREQ again to establish new session.

4.1.3 Change of Password

The Vendors are recommended to change their password at an interval of 3 months although the system would not guard against this. To change the password, Vendors can issue CHNGPWDREQ command through their system with existing password and new password. Both existing and new passwords are encrypted by session key obtained during logon process using Triple-DES algorithm (please see Appendix C for details). As before, the encrypted password should be transformed to Base64 format. After verifying the correctness of the existing password, IIS responds with CHNGPWDRESP to indicate if the changes are effective in IIS. The following response status can be found.

Response status	Additional information / Error Code	Description
SUCCESS		Successful status
FAILURE	INVALID_MESSAGE	Invalid message format
FAILURE	INCORRECT_SUBSCRIBER	Incorrect Vendor identity or password
FAILURE	INVALID_PASSWORD	Password is malformed (i.e. invalid character exists or length of password < 16) OR historical password is used. Refer to section 6 Security and Control for detail password requirement.
FAILURE	PERMISSION_DROP	Operation not allowed because permission is dropped
FAILURE	SESSION_NOT_ESTABLISHED	Cannot perform this function since session is not established
FAILURE	SERVICE_NOT_AVAILABLE	Service not available

A session must be established before this command can be issued.

4.1.4 Headline Recovery

The Vendor can request two kinds of headline recovery, full and partial, after logging onto IIS. Full headline recovery command FULLRECVYREQ is to rebuild a total of 1-day's headline. Partial headline recovery command PARTRECVYREQ with "Headline sequence number" is to rebuild all those headlines subsequent to this sequence number. IIS would respond with RECVYRESP with number of recovery headline to be sent to the Vendor.

During headline recovery, headlines are sent in a reverse chronological order. Attachment for such headlines is requested on demand from the Vendor. It should be noted that the most recent headline is also sent simultaneously to the Vendor during headline recovery. After all pieces of the recovery headline are sent, IIS sends an unsolicited message RECVYCOMPLETE to inform the Vendor the completion of the headline recovery.

The following is the request commands for headline recovery.

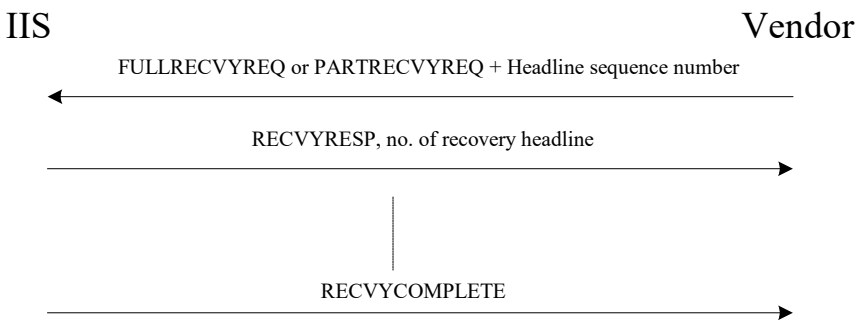
Request command	Additional information	Description
FULLRECVYREQ		Request 1-day online headline recovery
PARTRECVYREQ	Headline sequence number	Request recovery headlines which come after the one specified by headline sequence number

The following response status RECVYRESP can be found.

Response status	Additional information/ Error code	Description
SUCCESS	Number of recovery headline	Successful status
FAILURE	INVALID_MESSAGE	Invalid message format
FAILURE	PERMISSION_DROP	Operation not allowed because permission is dropped
FAILURE	SESSION_NOT_ESTABLISHED	Cannot perform this function since session is not established
FAILURE	NEWS_NOT_FOUND	Supplied Headline Sequence Number cannot be located in IIS.
FAILURE	SYSTEM_BUSY	The new request cannot be fulfilled because IIS is still processing recovery request
FAILURE	SERVICE_NOT_AVAILABLE	Service not available

The following is the unsolicited command to indicate the completion of the recovery headline.

Unsolicited command	Additional information	Description
RECVYCOMPLETE		To inform the Vendor that headline recovery is completed



4.1.5 Permission dropped

In cases where service to a Vendor has been suspended, the Vendor will receive PERMISSIONDROP unsolicited command message.

Unsolicited command	Additional information	Description
PERMISSIONDROP		To inform the Vendor that its identity cannot be used to access IIS service

Afterwards, the system will automatically disconnect the existing session.

4.1.6 Exceptional Handling

“SERVICE_NOT_AVAILABLE” status reveals that some of the components in IIS cannot be communicated. Thus, there may not be updated headline and logon mechanism may not be able to be accomplished. The Vendor should drop TCP/IP connection and try to connect to IIS for every 15 minutes.

On processing headline recovery request, IIS ignores new headline recovery request command with same unique request identity "ReqID". If the request identity is different, IIS responds with "SYSTEM_BUSY" status.

On the other hand, if there is no response from IIS within 30 seconds after a command has been sent, the Vendor should re-send the command with same unique request identity again. If no response is received, it is recommended to drop TCP/IP connection and then establish the TCP/IP connection again. Vendor should reconnect to IIS system once disconnection detected and keep the service outage within 5 minutes. Vendor is recommended to perform full recovery after reconnection in order to recover the lost IIS news and minimize the latency of receiving IIS news. Please make sure that the network connectivity between IIS and Vendor is fine and TCP/IP connection is established.

Annual drill for line failure reconnection will be arranged by HKEX-IS and the test result will be published on HKEX website for public reference.

4.2 Data messages

There are only one type of data message - headline.

4.2.1 Headline

Vendor will receive a UPDATEHEADLINE message for the most recent headline and a RECVYHEADLINE message for the recovery headline. Both messages can contain Unique Headline Identity, date/time, subtype, product categories, language, headline content, encoding format of the headline content, number of attachment and description of attachment. For UPDATEHEADLINE, a sequence number is assigned by IIS and this sequence number "Headline Sequence Number" is used for partial headline recovery.

There is a "Type" attribute defined in the UPDATEHEADLINE tag: [ALERT]/[FIRSTTAKE]/[SUBTAKE]/[CANCELLED]. More detailed explanation is found in next section.

The [FIRSTTAKE] headline contains News Identity, date/time, subtype, product categories, language and headline content while this type of headline is delivered to both headline and headline with attachment Vendors who subscribe those product categories. The [SUBTAKE] headline contains News Identity, date/time, subtype, product categories, language, headline content and attachment information while this type of headline is delivered to headline with attachment Vendors only. For news with multiple attachments, the subject name (a brief description of file content) for each individual attachment will also be included as part of the attachment information.

4.3 Control flow message

Control flow message is used to ensure that the communication between IIS and the Vendor is working properly. There is one message type – status enquiry.

4.3.1 Status enquiry

In general, IIS would issue STATUSREQ command to the Vendor if there is no traffic in both directions between IIS and Vendor for 120 seconds. Then the Vendor should respond with STATUSRESP status. If IIS does not receive this status response for another 120 seconds, it would issue the command again. After 120 seconds from the second STATUSREQ command, IIS disconnects the session by dropping the TCP/IP connection. Conversely, the Vendor can also issue STATUSREQ command to find out if IIS is working or not. The same format of STATUSRESP status response should be received. It is recommended for the Vendor to issue this command only when it does not receive any message from IIS for 60 seconds.

4.4 General exception

When the Vendor receives message that cannot be recognized as one of the above message codes or the message is an incomplete XML message, it should discard the message. If the Vendor receives 3 consecutive invalid messages, it is recommended to drop the existing TCP/IP connections and connect to IIS again. Similarly, when IIS receives 3 sequential invalid messages, it would drop TCP/IP connection automatically.

4.5 Attachment Retrieval

Having received the headline, the Vendor should have sufficient information to retrieve the associated attachment one by one. The attachment information coming with the headline includes “Unique Attachment identity”, attachment type (MIME), size of attachment in bytes and hash value of the attachment using MD5. The Vendor can connect to IIS File Transfer Server and acquire the desired news attachment file through FTP protocol. Once the file transfer process is completed, Vendor can calculate the hash value using MD5 for the attachment file and verify with the hash value come with corresponding news headline. In case of any discrepancy, it would mean that the attachment is corrupted and the Vendor should repeat the attachment retrieval process again.

A new element called URL is added in SUBTAKE to send the location of the news attachment in IIS File Transfer Server. Vendor can connect to the IIS File Transfer Server via FTP protocol and download the attachment using the file path provided in URL.

The following illustrated a SUBTAKE message which vendor should receive for this example.

```
<?xml version="1.0" encoding="UTF-8"?>
<NDSML xmlns="http://www.hkex.com.hk/iis" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
	<MsgHeader>
		<MsgDate>20061001T120000+0800</MsgDate>
		<MsgID>UPDATEHEADLINE</MsgID>
		<MsgType>NDSdata</MsgType>
	</MsgHeader>
	<UPDATEHEADLINE Type="SUBTAKE" SeqNo="2">
		<NewsML>
			<NewsItem>
				<NewsIdentifier>
					<ProviderId>HKEX-EPS</ProviderId>
					<DateId>20061001</DateId>
					<NewsItemId>0004911</NewsItemId>
				</NewsIdentifier>
				<DescriptiveMetadata>
					<Language FormalName="zh-hk"/>
					<SubjectCode>
						<SubjectMatter FormalName="08001" Scheme="Stock Code"/>
						<SubjectMatter FormalName="dG9tLmNvbQ==" Scheme="Stock
					Name"/>
						<SubjectMatter FormalName="08008" Scheme="Stock Code"/>
						<SubjectMatter FormalName="U3VuZXZpc2lvbiBIb2xkaW5n"
					Scheme="Stock Name"/>
						<SubjectMatter FormalName="08009" Scheme="Stock Code"/>
						<SubjectMatter FormalName="aU1lcmNoYW50cw=="
					Scheme="Stock Name"/>
						<SubjectMatter FormalName="10000" Scheme="Headline
					Category-T1"/>
						<SubjectMatter FormalName="16300" Scheme="Headline
					Category-T2"/>
						<SubjectMatter FormalName="16400" Scheme="Headline
					Category-T2"/>
						<SubjectMatter FormalName="18100" Scheme="Headline
					Category-T2"/>
						<SubjectMatter FormalName="GEM" Scheme="Mkt Code"/>
						<SubjectMatter FormalName="20060911" Scheme="Expiry
					Date"/>
					</SubjectCode>
				</DescriptiveMetadata>
				<NewsComponent>
					<NewsLines>
						<DateLine>20061001T120000+0800</DateLine>
```

```
                                        <HeadLine>
                                                <Encoding Notation="Base64">
                                                <DataContent>PDA4MDAxPjwwODAwOD48MDgw
                                        MDk+LTEwMDAwWzE2MzAwLDE2NDAwLDE4MTAwXShDQy1
                                        BMDAwNDkxMTUp</DataContent>
                                                </Encoding>
                                        </HeadLine>
                                </NewsLines>
                                <NoofContentItem>2</NoofContentItem>
                                <ContentItem Href="0">
                                        <Digest>
                                                <Encoding Notation="Base64">
                                                        <Encoding Notation="MD5">
                                                                <DataContent>lABa4ZzIV8fr2K
                                                        XzNqh0Tg==</DataContent>
                                                        </Encoding>
                                                </Encoding>
                                        </Digest>
                                        <SubjectName>
                                                <Encoding Notation="Base64">
                                                        <DataContent></DataContent>
                                                </Encoding>
                                        </SubjectName>
                                        <MimeType FormalName="APPLICATION/MSWORD"/>
                                        <Size>1546</Size>
                                        <URL>20061001/0004911-0.doc</URL>
                                </ContentItem>
                                <ContentItem Href="1">
                                        <Digest>
                                                <Encoding Notation="Base64">
                                                        <Encoding Notation="MD5">
                                                                <DataContent>lABa4ZzIV8fr2K
                                                        XzNqh0Tg==</DataContent>
                                                        </Encoding>
                                                </Encoding>
                                        </Digest>
                                        <SubjectName>
                                                <Encoding Notation="Base64">
                                                        <DataContent></DataContent>
                                                </Encoding>
                                        </SubjectName>
                                        <MimeType FormalName="APPLICATION/PDF"/>
                                        <Size>1546</Size>
                                        <URL>20061001/0004911-1.pdf</URL>
                                </ContentItem>
                        </NewsComponent>
                </NewsItem>
        </NewsML>
</UPDATEHEADLINE>
</NDSML>
```

For news with multiple file attachment, vendor need to rename the file downloaded from FTP server according to elements in our SUBTAKE message based on the following format.

<ProviderId> + "_" + <DateId> + "_" + <NewsItemId> + "_" + <ContentItem Href> + "." + FILE EXTENSION in <Url>

Example

SUBTAKE Message
<ProviderId>HKEX-EPS</ProviderId>
<DateId>20070108</DateId>
<NewsItemId>A10086384</NewsItemId>
<ContentItem Href="1">
<Url>/20070108/A10086384-1.PDF</Url>

Renamed file name
/HKEX-EPS_20070108_A10086384_1.PDF

5. Detailed Message Format

The message format for each message code in details is described in this section. This is an XML type of message including headline and segments of attachment. The XML schema can be found in the Appendix A for reference.

5.1 Command and Response Messages

The format of command status response is shown as follows.

```
<Status>
	<Success />
	<Failure>
		<ErrCode>NNNNN</ErrCode>
		<ErrMsg>[X]*</ErrMsg>
	</Failure>
</Status>
```

Tag	Format	M/O	Occurs	Description	Attributes	Format	M/O	Description
Status	complex	M	1	Response status				
Success	N/A	O	1	command is succeeded				
Failure	complex	O	1	command is failed				
ErrCode	[N]*5	O	1	Error code				
ErrMsg	[X]*	O	1	Error Message				

The <Success> tag indicates the command is successfully executed while the <Failure> tag indicates the command is failure to execute with <ErrCode> and <ErrMsg> explaining the reason. Either one of <Success> or <Failure> tags included in a <Status> tag.

5.1.1 INITREQ

```
<?xml version="1.0" encoding="UTF-8"?>
<NDSML xmlns="http://www.hkex.com.hk/iis">
	<MsgHeader>
		<MsgDate>20021223T050413+0800</MsgDate>
		<MsgID>INITREQ</MsgID>
		<MsgType>NDScmd</MsgType>
	</MsgHeader>
	<INITREQ ReqId="99999"/>
</NDSML>
```

Tag	Format	M/O	Occurs	Description	Attributes	Format	M/O	Description
INITREQ	N/A	M	1	Initialization request message	ReqId	[N]*5	M	request id used to be mapped with its response

5.1.2 INITRESP

```
<?xml version="1.0" encoding="UTF-8"?>
<NDSML xmlns="http://www.hkex.com.hk/iis">

	<MsgHeader>
		<MsgDate>20021223T050413+0800</MsgDate>
		<MsgID>INITRESP</MsgID>
		<MsgType>NDScmd</MsgType>
```

```
      </MsgHeader>
      <INITRESP ReqId="99999">
            <Status>
                  <Success />
                  <Failure>
                        <ErrCode>NNNNN</ErrCode>
                        <ErrMsg>[X]*</ErrMsg>
                  </Failure>
            </Status>
            <SessionKey>
                  <Encoding Notation="Base64">
                        <Encoding Notation="3DES">
                              <DataContent>[X]*</DataContent>
                        </Encoding>
                  </Encoding>
            </SessionKey>
      </INITRESP>
</NDSML>
```

Tag	Format	M/O	Occurs	Description	Attributes	Format	M/O	Description
INITRESP	complex	M	1	Initialization response message	ReqId	[N]*5	M	used to be mapped with its request
For success status:								
SessionKey	Complex	O	1	IIS Session key				
Encoding:1	Complex	M	1	Encoding of the Session key	Notation	Base64	M	Encoding Method (Base64)
Encoding:2	Complex	M	1	Encoding of the Session key in big-Endian format	Notation	3DES	M	Encoding Method (3DES)
DataContent	[X]*	M	1	Session key's data				

5.1.3 LOGONREQ

```
<?xml version="1.0" encoding="UTF-8"?>
<NDSML xmlns="http://www.hkex.com.hk/iis">
      <MsgHeader>
            <MsgDate>20021223T050413+0800</MsgDate>
            <MsgID>LOGONREQ</MsgID>
            <MsgType>NDScmd</MsgType>
      </MsgHeader>
      <LOGONREQ ReqId="99999">
            <Username>XXXXXXXX</Username>
            <Password>
                  <Encoding Notation="Base64">
                        <Encoding Notation="3DES">
                              <DataContent>[X]*</DataContent>
                        </Encoding>
                  </Encoding>
            </Password>
      </LOGONREQ>
</NDSML>
```

Tag	Format	M/O	Occurs	Description	Attributes	Format	M/O	Description
LOGONREQ	complex	M	1	Logon command	ReqId	[N]*5	M	To be mapped with its response
Logon Parameters:								
Username	[X]*10	M	1	Vendor identity				

Password	complex	M	1	Vendor password encrypted by IIS Session key				
Encoding:1	complex	M	1	Encoding of the password	Notation	Base64	M	Encoding Method (Base64)
Encoding:2	complex	M	1	Encoding of the password	Notation	3DES	M	Encoding Method (3DES)
DataContent	[X]*	M	1	Password's data				

5.1.4 LOGONRESP

```
<?xml version="1.0" encoding="UTF-8"?>
<NDSML xmlns="http://www.hkex.com.hk/iis">
      <MsgHeader>
            <MsgDate>20021223T050413+0800</MsgDate>
            <MsgID>LOGONRESP</MsgID>
            <MsgType>NDScmd</MsgType>
      </MsgHeader>
      <LOGONRESP ReqId="99999">
            <Status>
                  <Success />
                  <Failure>
                        <ErrCode>NNNNN</ErrCode>
                        <ErrMsg>[X]*</ErrMsg>
                  </Failure>
            </Status>
            <ServiceType>[HDL/HDL+ATT]</ServiceType>
            <PackageType>[A/B/C]+</PackageType>
            <LastLoginTime>20021221T030345+0800</LastLoginTime>
      </LOGONRESP>
</NDSML>
```

Tag	Format	M/O	Occurs	Description	Attributes	Format	M/O	Description
LOGONRESP	complex	M	1	Logon response message	ReqId	[N]*5	M	To be mapped with its request
For success status:								
ServiceType	HDL/HDL +ATT	M	1	Service Type				
PackageType	A/B/C..	M	1	Subscribed package type				
LastLoginTime	CCYYMMDDT24HHMISS[+-]NNNN	M	1	Last logon time				

5.1.5 LOGOFF

```
<?xml version="1.0" encoding="UTF-8"?>
<NDSML xmlns="http://www.hkex.com.hk/iis">
      <MsgHeader>
            <MsgDate>20021223T050413+0800</MsgDate>
            <MsgID>LOGOFF</MsgID>
            <MsgType>NDScmd</MsgType>
      </MsgHeader>
      <LOGOFF/>
</NDSML>
```

Tag	Format	M/O	Occurs	Description
LOGOFF	N/A	M	1	Logoff command

5.1.6 CHNGPWDREQ

```
<?xml version="1.0" encoding="UTF-8"?>
<NDSML xmlns="http://www.hkex.com.hk/iis">
      <MsgHeader>
            <MsgDate>20021223T050413+0800</MsgDate>
            <MsgID>CHNGPWDREQ</MsgID>
            <MsgType>NDScmd</MsgType>
      </MsgHeader>
      <CHNGPWDREQ ReqId="99999">
            <Password>
                  <Encoding Notation="Base64">
                        <Encoding Notation="3DES">
                              <DataContent>[X]*</DataContent>
                        </Encoding>
                  </Encoding>
            </Password>
            <NewPassword>
                  <Encoding Notation="Base64">
                        <Encoding Notation="3DES">
                              <DataContent>[X]*</DataContent>
                        </Encoding>
                  </Encoding>
            </NewPassword>
      </CHNGPWDREQ>
</NDSML>
```

Tag	Format	M/O	Occurs	Description	Attributes	Format	M/O	Description
CHNGPWDREQ	complex	M	1	Change password command	ReqId	[N]*5	M	To be mapped with its response
Request Parameters:								
Password	complex	M	1	Vendor old password encrypted by IIS Session key				
Encoding:1	complex	M	1	Encoding of the password	Notation	Base64	M	Encoding Method (Base64)
Encoding:2	complex	M	1	Encoding of the password	Notation	3DES	M	Encoding Method (3DES)
DataContent	[X]*	M	1	Password's data				
NewPassword	complex	M	1	Vendor new password encrypted by IIS Session key				
Encoding:1	complex	M	1	Encoding of the password	Notation	Base64	M	Encoding Method (Base64)
Encoding:2	complex	M	1	Encoding of the password	Notation	3DES	M	Encoding Method (3DES)
DataContent	[X]*	M	1	Password's data				

5.1.7 CHNGPWDRESP

```
<?xml version="1.0" encoding="UTF-8"?>
<NDSML xmlns="http://www.hkex.com.hk/iis">
      <MsgHeader>
            <MsgDate>20021223T050413+0800</MsgDate>
            <MsgID>CHNGWDRESP</MsgID>
```

```
            <MsgType>NDScmd</MsgType>
      </MsgHeader>
      <CHNGPWDRESP ReqId="99999">
            <Status>
                  <Success />
                  <Failure>
                        <ErrCode>NNNNN</ErrCode>
                        <ErrMsg>[X]*</ErrMsg>
                  </Failure>
            </Status>
      </CHNGPWDRESP>
</NDSML>
```

Tag	Format	M/O	Occurs	Description	Attributes	Format	M/O	Description
CHNGPWDRESP	complex	M	1	Change password response message	ReqId	[N]*5	M	To be mapped with its request

5.1.8 FULLRECVYREQ

```
<?xml version="1.0" encoding="UTF-8"?>
<NDSML xmlns="http://www.hkex.com.hk/iis">
      <MsgHeader>
            <MsgDate>20021223T050413+0800</MsgDate>
            <MsgID>FULLRECVYREQ</MsgID>
            <MsgType>NDScmd</MsgType>
      </MsgHeader>
      <FULLRECVYREQ ReqId="99999"/>
</NDSML>
```

Tag	Format	M/O	Occurs	Description	Attributes	Format	M/O	Description
FULLRECVYREQ	N/A	M	1	Request for full recovery command	ReqId	[N]*5	M	To be mapped with its response

5.1.9 PARTRECVYREQ

```
<?xml version="1.0" encoding="UTF-8"?>
<NDSML xmlns="http://www.hkex.com.hk/iis">
      <MsgHeader>
            <MsgDate>20021223T050413+0800</MsgDate>
            <MsgID>PARTRECVYREQ</MsgID>
            <MsgType>NDScmd</MsgType>
      </MsgHeader>
      <PARTRECVYREQ ReqId="99999">
            <NewsSeqNo>9999999999</NewsSeqNo>
      </PARTRECVYREQ>
</NDSML>
```

Tag	Format	M/O	Occurs	Description	Attributes	Format	M/O	Description
PARTRECVYREQ	N/A	M	1	Request for partial recovery command	ReqId	[N]*5	M	To be mapped with its response
NewsSeqNo	[9]*10	M	1	Last sequence number of the headline received				

5.1.10 RECVYRESP

```
<?xml version="1.0" encoding="UTF-8"?>
<NDSML xmlns="http://www.hkex.com.hk/iis">
      <MsgHeader>
            <MsgDate>20021223T050413+0800</MsgDate>
            <MsgID>RECVYRESP</MsgID>
            <MsgType>NDScmd</MsgType>
      </MsgHeader>
      <RECVYRESP ReqId="99999">
            <Status>
                  <Success />
                  <Failure>
                        <ErrCode>NNNNN</ErrCode>
                        <ErrMsg>[X]*</ErrMsg>
                  </Failure>
            </Status>
            <NoofNewsItem>999</NoofNewsItem>
      </RECVYRESP>
</NDSML>
```

Tag	Format	M/O	Occurs	Description	Attributes	Format	M/O	Description
RECVYRESP	complex	M	1	Full recovery/ Partial recovery response	ReqId	[N]*5	M	used to be mapped with its request
For Success Status :								
NoofNewsItem	[9]*3	O	1	Number of recovered headlines				

5.1.11 RECVYCOMPLETE

```
<?xml version="1.0" encoding="UTF-8"?>
<NDSML xmlns="http://www.hkex.com.hk/iis">
      <MsgHeader>
            <MsgDate>20021223T050413+0800</MsgDate>
            <MsgID>RECVYCOMPLETE</MsgID>
            <MsgType>NDScmd</MsgType>
      </MsgHeader>
      <RECVYCOMPLETE ReqId="99999"/>
</NDSML>
```

Tag	Format	M/O	Occurs	Description	Attributes	Format	M/O	Description
RECVYCOMPLETE	N/A	M	1	Notification to Vendor for recovery completeness	ReqId	[N]*5	M	used to be mapped with its request

5.1.12 PERMISSIONDROP

```
<?xml version="1.0" encoding="UTF-8"?>
<NDSML xmlns="http://www.hkex.com.hk/iis">
      <MsgHeader>
            <MsgDate>20021223T050413+0800</MsgDate>
            <MsgID>PERMISSIONDROP</MsgID>
            <MsgType>NDScmd</MsgType>
      </MsgHeader>
      <PERMISSIONDROP>
            <Reason>[X]*</Reason>
      </PERMISSIONDROP>
</NDSML>
```

Tag	Format	M/O	Occurs	Description
PERMISSIONDROP	N/A	M	1	Notification to Vendor that their permission is revoked.
Reason	[X]*	M	1	The reason why Vendor's permission is dropped

5.2 Data Messages

5.2.1 UPDATEHEADLINE and RECVYHEADLINE

These two types of headline share the same format except that the content is enclosed by <UPDATEHEADLINE> and <RECVYHEADLINE> tags for updated and recovery headline respectively.

The following is an example of UPDATEHEADLINE.

```
<?xml version="1.0" encoding="UTF-8"?>
<NDSML xmlns="http://www.hkex.com.hk/iis">
      <MsgHeader>
            <MsgDate>20021223T050413+0800</MsgDate>
            <MsgID>UPDATEHEADLINE</MsgID>
            <MsgType>NDSdata</MsgType>
      </MsgHeader>
      <UPDATEHEADLINE Type="SUBTAKE" SeqNo="9999999999">
             <NewsML>
               <NewsItem>
                  <NewsIdentifier>
                     <ProviderId>HKEX-XXX</ProviderId>
                     <DateId>20021223</DateId>
                     <NewsItemId>[X]*</NewsItemId>
                  </NewsIdentifier>
                     <DescriptiveMetadata>
                        <Language FormalName="XX-XX"/>
                        <SubjectCode>
                           <SubjectMatter FormalName="[X]*" Scheme="[X]*"/>
                        </SubjectCode>
                     </DescriptiveMetadata>
                     <NewsComponent>
                        <NewsLines>
                           <DateLine>20021223T050413+0800</DateLine>
                           <HeadLine>
                              <Encoding Notation="Base64">
                                 <DataContent>[X]*</DataContent>
                              </Encoding>
                           </HeadLine>
                        </NewsLines>
                        <NoofContentItem>999</NoofContentItem>
                        <ContentItem Href="[X]*">
                           <Digest>
                              <Encoding Notation="Base64">
                                 <Encoding Notation="MD5">
                                    <DataContent>[X]*</DataContent>
                                 </Encoding>
                              </Encoding>
                           </Digest>
                           <SubjectName>
                              <Encoding Notation="Base64">
                                  <DataContent>[X]*</DataContent>
                              </Encoding>
                           </SubjectName>
                           <MimeType FormalName="[X]*"/>
```

```
                              <Size>9999999999</Size>
                            </ContentItem>
                          </NewsComponent>
                        </NewsItem>
                      </NewsML>
                </UPDATEHEADLINE>
</NDSML>
```

For recovery headline, the tag <UPDATEHEADLINE> is replaced by <RECVYHEADLINE>.

In either type of headline, there is one field called subtype which is used to identify types of headline. The following table summarizes the types of headline.

Subtype	**Description**
ALERT	Indicating that this is a headline without any attachment
FIRSTTAKE	Indicating that this is the first time IIS has received this headline and it contains headline content and news information
SUBTAKE	Indicating that IIS has received all information including attachment from the source and it contains headline content, news information and attachment information
CANCELLED	Indicating that the headline identified by <NewsIdentifier> is cancelled in the news source.
AMENDED	Indicating that the headline identified by <NewsIdentifier> is an amended news in the news source.

As mentioned in previous sections, SUBTAKE is only sent to “Headline with attachment” vendors only while FIRSTTAKE is delivered to both “Headline” vendors and “Headline with attachment” vendors.

For CANCELLED subtype, it is up to the Vendor to remove the news or not while the headline content indicates that this headline is cancelled. This headline is still sent during recovery.

Upon data recovery, the Vendor will receive the latest headlines. In this case, the cancelled headline will be received earlier than the original headline that were cancelled after Vendor has performed data recovery or when IIS has just switched from the Primary Site to Disaster Recovery Site, or vice versa.

Amendment of Headline Category – where only Headline Category in the news was amended. Same as amended news, Vendor will receive a CANCELLED message with the news identity indicating the original version of the news that is being amended. An AMENDED message with a new news identity and new Headline Categories is then sent to Vendor after the CANCELLED message. Vendor can co-relate the amended version of the news and the original version of the amended news by using the news title. News title will remain unchanged even Headline Category (T1 or T2) is changed during the amendment process. Upon data recovery, Vendor will receive the latest headlines first. Hence, Vendor will receive AMENDED message and followed with the CANCELLED message. However, in this case, the original FIRSTTAKE message with the original version of the amended news is not provided. This will happen after Vendor has performed data recovery or when IIS has just switched from the Primary Site to Disaster Recovery Site, or vice versa.

For illustration, the following examples depict how AMENDED message will work under normal and recovery processes. All messages are listed in order of time sequence when the message is received by Vendor.

Amendment of Headline Category (**for immediate released news**)

Order	Message Type	Message Property
1	FIRSTTAKE	News ID=1000 Headline Category-T1=10000 Headline Category-T2=20000 Headline Category-T2=20001
2	SUBTAKE	News ID=1000 Headline Category-T1=10000 Headline Category-T2=20000 Headline Category-T2=20001 Attachment=File1.doc
3	CANCELLED	News ID=1000 Headline Category-T1=10000 Headline Category-T2=20000 Headline Category-T2=20001
4	AMENDED	News ID=2000 Headline Category-T1=40000 Headline Category-T2=50000 Headline Category-T2=50001
5	SUBTAKE	News ID=2000 Headline Category-T1=40000 Headline Category-T2=50000 Headline Category-T2=50001 Attachment=File1.doc

Amendment of Headline Category (**for immediate released news** during Recovery Process)

Order	Message Type	Message Property
1	AMENDED	News ID=2000 Headline Category-T1=40000 Headline Category-T2=50000 Headline Category-T2=50001
2	SUBTAKE	News ID=2000 Headline Category-T1=40000 Headline Category-T2=50000 Headline Category-T2=50001 Attachment=File1.doc
3	CANCELLED	News ID=1000 Headline Category-T1=10000 Headline Category-T2=20000 Headline Category-T2=20001

For some business reasons, some news may be hold up and released at specific time. If any modification such as cancellation and headline amendment may be applied to these pending news and the possible message sequence is shown as follow:

Amendment of Headline Category (for hold up original news and immediate released amended news)

Order	Message Type	Message Property
1	FIRSTTAKE **Hold up by IIS and will not deliver to Vendor**	News ID=1000 Headline Category-T1=10000 Headline Category-T2=20000 Headline Category-T2=20001
2	SUBTAKE **Hold up by IIS and will not deliver to Vendor**	News ID=1000 Headline Category-T1=10000 Headline Category-T2=20000 Headline Category-T2=20001 Attachment=File1.doc
3	AMENDED	News ID=2000 Headline Category-T1=40000 Headline Category-T2=50000

		Headline Category-T2=50001
4	SUBTAKE	News ID=2000 Headline Category-T1=40000 Headline Category-T2=50000 Headline Category-T2=50001 Attachment=File1.doc
5	CANCELLED **Release to Vendor at specific time and later than the above mentioned AMENDED and related SUBTAKE**	News ID=1000 Headline Category-T1=10000 Headline Category-T2=20000 Headline Category-T2=20001

Amendment of Headline Category (for hold up original news and immediate released amended news during recovery)

Order	Message Type	Message Property
1	AMENDED	News ID=2000 Headline Category-T1=40000 Headline Category-T2=50000 Headline Category-T2=50001
2	SUBTAKE	News ID=2000 Headline Category-T1=40000 Headline Category-T2=50000 Headline Category-T2=50001 Attachment=File1.doc
3	CANCELLED	News ID=1000 Headline Category-T1=10000 Headline Category-T2=20000 Headline Category-T2=20001

Amendment of Headline Category (for hold up original news and cancelled news before release)

Order	Message Type	Message Property
1	FIRSTTAKE **Hold up by IIS and will not deliver to Vendor**	News ID=1000 Headline Category-T1=10000 Headline Category-T2=20000 Headline Category-T2=20001
2	SUBTAKE **Hold up by IIS and will not deliver to Vendor**	News ID=1000 Headline Category-T1=10000 Headline Category-T2=20000 Headline Category-T2=20001 Attachment=File1.doc
3	CANCELLED **Release to Vendor at specific time**	News ID=1000 Headline Category-T1=10000 Headline Category-T2=20000 Headline Category-T2=20001

Amendment of Headline Category (for hold up original news and cancelled news before release during recovery)

Order	Message Type	Message Property
3	CANCELLED	News ID=1000 Headline Category-T1=10000 Headline Category-T2=20000 Headline Category-T2=20001

Note:
In addition to CANCELLED and AMENDED message for current day news, it is possible for Vendor to receive any CANCELLED and AMENDED message for past news.

The unique identity of news is revealed by <ProviderId>, <DateId> and <NewsItemId>. The news information such as document type code (category) and stock code are found within <DescriptiveMetadata> tag. There are four types of subject code within <DescriptiveMetadata> and these include category code (or called Headline Category), market code, stock code, stock name, and expiry date. Category code identifies the category of the information, e.g. company profile or financial report. Market code reveals what markets the information is related to, e.g. GEM board. Multiple numbers of <SubjectMatter> tags can be found in one headline summary. Expiry date identifies the news expiry date*. The news should not be sent out if current date greater than the expiry date. Please refer to appendix F for mapping and example.

*News expiry date: certain announcements will be kept releasing on various channels, e.g. HKEX web, OMD-C repeatedly for a certain period whereas those announcements will only be released once in IIS, but with an expiry date for Vendors to identify and replicate those news for their subscribers before the expiry date, if they wish.

<NewsComponent> is an indicator of the attachment. Thus, number of attachment is explained by <NoofContentItem> tag while each attachment information and contents of headline are given within <NewsComponent> such as date/time, headline content, message digest, type (MIME), e.g. APPLICATION/PDF for PDF file format, and size in bytes of each attachment.

A headline sequence number is assigned to each headline sent from IIS no matter what kinds of SUBTAKE. This sequence number is used for partial headline recovery. Thus, same unique identity of news as mentioned would have different sequence number for different kinds of subtype. The sequence number of recovery headline for same update headline is the same.

Tag	Format	M/O	Occurs	Description	Attributes	Format	M/O	Description
UPDATEHEADLINE	complex	M	1	News Headline Message	Type	ALERT/ FIRSTTAKE/ SUBTAKE/ CANCELLED/ CONTINGENCY	M	Subtype of the headline
					SeqNo	[9]*10	M	Unique identifier of this message
NewsML	complex	M	1	News Markup language (by IPTC)				
NewsItem	complex	M	1	News Item				
NewsIdentitifier	complex	M	1	The news identifier in IIS				
ProviderID	HKEX-XXX	M	1	Provider of the news. Possible values: HKEX-EPS, HKEX-EXN, HKEX-MND				
DateID	CCYYMMDD	M	1	Issue date of the news				
NewsItemId	[X]*	M	1	News Item sequence no				
DescriptiveMetadata	complex	O	1	New Item Descriptive data				
Language	complex	O	1	Language of news headline and attachments News headline and attachments are in Unicode	FormalName	XX-XX ISO 639 Language code – ISO 3166 country code	M	ISO language code
SubjectCode	complex	O	1	Classification keywords				
SubjectMatter	N/A	O	*	keyword describing the news	FormalName	[Category code]	M	Category code of IIS for classifying the news
					Scheme	Naming Scheme	O	Naming scheme of

								FormalName attribute.
NewsComponent	complex	M	1	News content				
NewsLines	complex	M	1	News Header				
HeadLine	complex	M	1	News Headline				
Encoding:1	complex	M	1	Encoding of the data content	Notation	[x]*	M	Encoding Method (Base64)
DataContent	[X]*	M	1	Headline's data				
NoOfContentItem	complex	O	*	Total number of News Attachment				
ContentItem	complex	O	*	News Attachment				
Digest	complex	M	1	MD5 Digest of the attachment				
Encoding:1	complex	M	1	Encoding of the Digest	Notation	Base64	M	Encoding Method (Base64)
Encoding:2	Complex	M	1	Language Encoding of the Headline	Notation	MD5	M	Encoding Method (MD5)
DataContent	[X]*	M	1	Digest's data				
SubjectName	complex	O	*	Attachment content description for each multiple file				
Encoding	complex	M	1	Encoding of the SubjectName	Notation	Base64	M	Encoding Method (Base 64)
DataContent	[X]*	M	1	SubjectName's data				
MimeType	complex	M	1	MIME type of the attachment	FormalName	[[X]*8]	M	MIME Type
Size	[9]*12	M	1	Size of the attachment				

As before, for recovery headline, the tag <UPDATEHEADLINE> is replaced by <RECVYHEADLINE>.

5.3 Control Flow Messages

5.3.1 STATUSREQ

```
<?xml version="1.0" encoding="UTF-8"?>
<NDSML xmlns="http://www.hkex.com.hk/iis">
      <MsgHeader>
            <MsgDate>20021223T050413+0800</MsgDate>
            <MsgID>STATUSREQ</MsgID>
            <MsgType>NDSctrl</MsgType>
      </MsgHeader>
      <STATUSREQ ReqId="99999"/>
</NDSML>
```

Tag	Format	M/O	Occurs	Description	Attributes	Format	M/O	Description
STATUSREQ	Complex	M	1	Connection Status enquiry	ReqId	[N]*5	M	used to be mapped with its response

5.3.2 STATUSRESP

```
<?xml version="1.0" encoding="UTF-8"?>
<NDSML xmlns="http://www.hkex.com.hk/iis">
      <MsgHeader>
            <MsgDate>20021223T050413+0800</MsgDate>
            <MsgID>STATUSRESP</MsgID>
            <MsgType>NDSctrl</MsgType>
      </MsgHeader>
      <STATUSRESP ReqId="99999"/>
```

```
</NDSML>
```

Tag	Format	M/O	Occurs	Description	Attributes	Format	M/O	Description
STATUSRESP	Complex	M	1	Connection Status enquiry response	ReqId	[N]*5	M	used to be mapped with its request

6. SECURITY AND CONTROL

IIS does not force the expiry of the vendor password. However, IIS vendors are recommended to change their password at an interval of 3 months for security reasons though the system would not guard against this.

Vendors' passwords should meet all the following items as required by IIS:

<table>
<tr><th>Item</th><th>Requirement</th></tr>
<tr><td>Length of password</td><td>- At least 16 characters
- Maximum 20 characters</td></tr>
<tr><td>Complexity of password</td><td>Must contain a combination of:
1. Upper case letter
2. Lower case letter
3. Number
4. Special character as listed below:
<table>
<tr><th>Character</th><th>Name</th></tr>
<tr><td>!</td><td>Exclamation</td></tr>
<tr><td>@</td><td>At sign</td></tr>
<tr><td>#</td><td>Number sign (hash)</td></tr>
<tr><td>$</td><td>Dollar sign</td></tr>
<tr><td>^</td><td>Caret</td></tr>
<tr><td>&</td><td>Ampersand</td></tr>
<tr><td>*</td><td>Asterisk</td></tr>
<tr><td>(</td><td>Left parenthesis</td></tr>
<tr><td>)</td><td>Right parenthesis</td></tr>
</table></td></tr>
<tr><td>Enforce password history</td><td>Not the same as any of the last 5 passwords</td></tr>
</table>

HKEX's network has applied different levels of security measures to provide a secure infrastructure for the Issuer Information *feed* Service (IIS) System. All network routers and LAN switches are password protected. The password protection has restricted access to network components.

Packet filtering is applied in all core routers within the network. Filtering rules are configured consistently in all routers throughout the path from Vendors' sites to IIS host system and the network only allows traffic to travel in pre-defined paths. Any attempt from a Vendors' site to connect with other un-predefined network components or another peer Vendor's site will be blocked.

Static routing is applied for traffic between the Vendors' sites and the core network of HKEX. The core network routers never accept routing updates from the Vendor's site routers as no routing protocol is running at these WAN interfaces. Static routes are configured for Vendor's routers. Only routes to HKEX's host site networks are configured.

The network will ride on HKEX's Securities and Derivatives Network (SDNet/2) in the form of virtual private network. With the provision of private LAN (VLAN), only pre-defined network access points can communicate with each other.

Appendix A XML Schema for Message Validation

This is for reference only. The actual XML schema is to be delivered by HKEX-IS through email.

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- edited with XML Spy v4.1 U (http://www.xmlspy.com) -->
<xsd:schema targetNamespace="http://www.hkex.com.hk/iis" xmlns="http://www.hkex.com.hk/iis"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" elementFormDefault="qualified">
    <xsd:simpleType name="gmtDateTime">
        <xsd:restriction base="xsd:string">
            <xsd:pattern value="20[0-9][0-9](0[1-9]|1[0-2])(0[1-9]|[1-2][0-9]|3[0-1])(T([0-1][0-9]|2[0-3])([0-5][0-9][0-
5][0-9]|2400)([+-](0[0-9]|1[0-1])([0-5][0-9]|1200))?)?"/>
        </xsd:restriction>
    </xsd:simpleType>
    <xsd:simpleType name="mesgType">
        <xsd:restriction base="xsd:string">
            <xsd:enumeration value="NDScmd"/>
            <xsd:enumeration value="NDSctrl"/>
            <xsd:enumeration value="NDSdata"/>
        </xsd:restriction>
    </xsd:simpleType>
    <xsd:simpleType name="services">
        <xsd:restriction base="xsd:string">
            <xsd:enumeration value="HDL"/>
            <xsd:enumeration value="HDL+ATT"/>
        </xsd:restriction>
    </xsd:simpleType>
    <xsd:simpleType name="long">
        <xsd:restriction base="xsd:integer">
            <xsd:minInclusive value="0"/>
            <xsd:maxInclusive value="9999999999"/>
        </xsd:restriction>
    </xsd:simpleType>
    <xsd:simpleType name="quantity">
        <xsd:restriction base="xsd:integer">
            <xsd:minInclusive value="0"/>
            <xsd:maxInclusive value="99999"/>
        </xsd:restriction>
    </xsd:simpleType>
    <xsd:simpleType name="segment">
        <xsd:restriction base="xsd:integer">
            <xsd:minInclusive value="0"/>
            <xsd:maxInclusive value="9999"/>
        </xsd:restriction>
    </xsd:simpleType>
    <xsd:simpleType name="userid">
        <xsd:restriction base="xsd:string">
            <xsd:minLength value="1"/>
            <xsd:maxLength value="10"/>
        </xsd:restriction>
    </xsd:simpleType>
    <xsd:simpleType name="errcde">
        <xsd:restriction base="xsd:string">
            <xsd:pattern value="[1-9][0-9][0-9][0-9][0-9]"/>
        </xsd:restriction>
    </xsd:simpleType>
    <xsd:simpleType name="id">
        <xsd:restriction base="xsd:string">
            <xsd:pattern value="[0-9][0-9][0-9][0-9][0-9]"/>
        </xsd:restriction>
    </xsd:simpleType>
    <xsd:simpleType name="dateonly">
        <xsd:restriction base="xsd:string">
            <xsd:pattern value="20[0-9][0-9](0[1-9]|1[0-2])(0[1-9]|[1-2][0-9]|3[0-1])"/>
        </xsd:restriction>
    </xsd:simpleType>
    <xsd:simpleType name="provider">
        <xsd:restriction base="xsd:string">
            <xsd:enumeration value="HKEX-EPS"/>
            <xsd:enumeration value="HKEX-EXN"/>
```

```
            <xsd:enumeration value="HKEX-MND"/>
        </xsd:restriction>
    </xsd:simpleType>
    <xsd:simpleType name="newsItemid">
    <xsd:restriction base="xsd:string" />
    </xsd:simpleType>
    <xsd:element name="DataContent">
        <xsd:complexType>
            <xsd:simpleContent>
                <xsd:extension base="xsd:string">
                    <xsd:attribute name="Segment" type="id"/>
                </xsd:extension>
            </xsd:simpleContent>
        </xsd:complexType>
    </xsd:element>
    <xsd:group name="SingleEncodedData">
        <xsd:sequence>
            <xsd:element name="Encoding">
                <xsd:complexType>
                    <xsd:sequence>
                        <xsd:element ref="DataContent"/>
                    </xsd:sequence>
                    <xsd:attribute name="Notation" type="xsd:string" use="required"/>
                </xsd:complexType>
            </xsd:element>
        </xsd:sequence>
    </xsd:group>
    <xsd:element name="Failure">
        <xsd:annotation>
            <xsd:documentation>
=================================== Failure ===================================
Failure Status
================================================================================
            </xsd:documentation>
        </xsd:annotation>
        <xsd:complexType>
            <xsd:sequence>
                <xsd:element name="ErrCode" type="errcde"/>
                <xsd:element name="ErrMsg" type="xsd:string"/>
            </xsd:sequence>
        </xsd:complexType>
    </xsd:element>
    <xsd:element name="Status">
        <xsd:annotation>
            <xsd:documentation>
=================================== Status ====================================
Response Result
================================================================================
            </xsd:documentation>
        </xsd:annotation>
        <xsd:complexType mixed="true">
            <xsd:choice>
                <xsd:element name="Success" type="xsd:string"/>
                <xsd:element ref="Failure"/>
            </xsd:choice>
        </xsd:complexType>
    </xsd:element>
    <xsd:element name="MsgHeader">
        <xsd:annotation>
            <xsd:documentation>
================================= MsgHeader ==================================
Header Information of IIS message.
================================================================================
            </xsd:documentation>
        </xsd:annotation>
        <xsd:complexType>
            <xsd:sequence>
                <xsd:element name="MsgDate" type="gmtDateTime"/>
                <xsd:element name="MsgID" type="xsd:string"/>
                <xsd:element name="MsgType" type="mesgType"/>
            </xsd:sequence>
```

```
        </xsd:complexType>
    </xsd:element>
    <xsd:element name="NewsIdentifier">
        <xsd:annotation>
            <xsd:documentation>
================================== NewsIdentifier ==================================
A globally unique identifier for a NewsItem.
====================================================================================

            </xsd:documentation>
        </xsd:annotation>
        <xsd:complexType>
            <xsd:sequence>
                <xsd:element name="ProviderId" type="provider"/>
                <xsd:element name="DateId" type="dateonly"/>
                <xsd:element name="NewsItemId" type="newsItemid"/>
            </xsd:sequence>
        </xsd:complexType>
    </xsd:element>
    <xsd:element name="NewsItem">
        <xsd:annotation>
            <xsd:documentation>
================================== NewsItem ==================================
Modified NewsML
==============================================================================
            </xsd:documentation>
        </xsd:annotation>
        <xsd:complexType>
            <xsd:sequence>
                <xsd:element ref="NewsIdentifier"/>
                <xsd:element ref="DescriptiveMetadata" minOccurs="0"/>
                <xsd:element ref="NewsComponent"/>
            </xsd:sequence>
        </xsd:complexType>
    </xsd:element>
    <xsd:element name="DescriptiveMetadata">
        <xsd:annotation>
            <xsd:documentation>
============================== DescriptiveMetadata==============================
List of Stock code, subject code, announcement type etc.
==============================================================================
            </xsd:documentation>
        </xsd:annotation>
        <xsd:complexType>
            <xsd:sequence>
                <xsd:element name="Language">
                    <xsd:complexType>
                        <xsd:attribute name="FormalName" type="xsd:string" use="required"/>
                        <xsd:attribute name="Scheme" type="xsd:string"/>
                    </xsd:complexType>
                </xsd:element>
                <xsd:element name="SubjectCode">
                    <xsd:complexType>
                        <xsd:sequence>
                            <xsd:element name="SubjectMatter" maxOccurs="unbounded">
                                <xsd:complexType>
                                    <xsd:attribute name="FormalName" type="xsd:string" use="required"/>
                                    <xsd:attribute name="Scheme" type="xsd:string"/>
                                </xsd:complexType>
                            </xsd:element>
                        </xsd:sequence>
                    </xsd:complexType>
                </xsd:element>
            </xsd:sequence>
        </xsd:complexType>
    </xsd:element>
    <xsd:element name="NewsLines">
        <xsd:annotation>
            <xsd:documentation>
================================ NewsLines ================================
News Headline
```

```
==========================================================================
            </xsd:documentation>
        </xsd:annotation>
        <xsd:complexType>
            <xsd:sequence>
                <xsd:element name="DateLine" type="gmtDateTime"/>
                <xsd:element name="HeadLine">
                    <xsd:complexType>
                        <xsd:sequence>
                            <xsd:group ref="SingleEncodedData"/>
                        </xsd:sequence>
                    </xsd:complexType>
                </xsd:element>
            </xsd:sequence>
        </xsd:complexType>
    </xsd:element>
    <xsd:element name="NoofContentItem" type="quantity">
        <xsd:annotation>
            <xsd:documentation>
==============================NoofContentItem====================================
count of content item
==========================================================================
            </xsd:documentation>
        </xsd:annotation>
    </xsd:element>
    <xsd:element name="ContentItem">
        <xsd:annotation>
            <xsd:documentation>
================================ ContentItem ================================
News content/attachment
==========================================================================
            </xsd:documentation>
        </xsd:annotation>
        <xsd:complexType>
            <xsd:choice>
                <xsd:sequence>
                    <xsd:element name="Digest">
                        <xsd:complexType>
                            <xsd:sequence>
                                <xsd:element name="Encoding">
                                    <xsd:complexType>
                                        <xsd:group ref="SingleEncodedData"/>
                                        <xsd:attribute name="Notation" type="xsd:string" use="required"/>
                                    </xsd:complexType>
                                </xsd:element>
                            </xsd:sequence>
                        </xsd:complexType>
                    </xsd:element>
                    <xsd:element name="SubjectName">
                        <xsd:complexType>
                            <xsd:sequence>
                                <xsd:group ref="SingleEncodedData"/>
                            </xsd:sequence>
                        </xsd:complexType>
                    </xsd:element>

                    <xsd:element name="MimeType">
                        <xsd:complexType>
                            <xsd:attribute name="FormalName" type="xsd:string" use="required"/>
                            <xsd:attribute name="Scheme" type="xsd:string"/>
                        </xsd:complexType>
                    </xsd:element>
                    <xsd:element name="Size" type="long"/>
                </xsd:sequence>
                <xsd:sequence>
                    <xsd:group ref="SingleEncodedData"/>
                </xsd:sequence>
            </xsd:choice>
            <xsd:attribute name="Href" type="xsd:string" use="required"/>
        </xsd:complexType>
    </xsd:element>
```

```
    <xsd:element name="NewsComponent">
        <xsd:annotation>
            <xsd:documentation>
============================== NewsComponent ================================
News Headline and content.
=============================================================================
            </xsd:documentation>
        </xsd:annotation>
        <xsd:complexType>
            <xsd:sequence>
                <xsd:element ref="NewsLines" minOccurs="0"/>
                <xsd:element ref="NoofContentItem" minOccurs="0"/>
                <xsd:element ref="ContentItem" minOccurs="0" maxOccurs="unbounded"/>
            </xsd:sequence>
        </xsd:complexType>
    </xsd:element>
    <xsd:element name="NewsML">
        <xsd:annotation>
            <xsd:documentation>
================================== NewsML ===================================
Modified NewsML
=============================================================================
            </xsd:documentation>
        </xsd:annotation>
        <xsd:complexType>
            <xsd:sequence>
                <xsd:element ref="NewsItem"/>
            </xsd:sequence>
        </xsd:complexType>
    </xsd:element>
    <xsd:element name="ReqContentItem">
        <xsd:annotation>
            <xsd:documentation>
================================ ReqContentItem =============================
Attachment request
=============================================================================
            </xsd:documentation>
        </xsd:annotation>
        <xsd:complexType>
            <xsd:attribute name="Href" type="xsd:string" use="required"/>
        </xsd:complexType>
    </xsd:element>
    <xsd:element name="LOGONREQ">
        <xsd:annotation>
            <xsd:documentation>
================================== LOGONREQ =================================
Vendor Logon command message
=============================================================================

            </xsd:documentation>
        </xsd:annotation>
        <xsd:complexType>
            <xsd:sequence>
                <xsd:element name="Username" type="userid"/>
                <xsd:element name="Password">
                    <xsd:complexType>
                        <xsd:sequence>
                            <xsd:element name="Encoding">
                                <xsd:complexType>
                                    <xsd:group ref="SingleEncodedData"/>
                                    <xsd:attribute name="Notation" type="xsd:string" use="required"/>
                                </xsd:complexType>
                            </xsd:element>
                        </xsd:sequence>
                    </xsd:complexType>
                </xsd:element>
            </xsd:sequence>
            <xsd:attribute name="ReqId" type="quantity" use="required"/>
        </xsd:complexType>
    </xsd:element>
    <xsd:element name="LOGONRESP">
```

```
        <xsd:annotation>
            <xsd:documentation>
================================= LOGONRESP ================================
Vendor Logon command response
============================================================================
            </xsd:documentation>
        </xsd:annotation>
        <xsd:complexType>
            <xsd:sequence>
                <xsd:element ref="Status"/>
                <xsd:element name="ServiceType" type="services" minOccurs="0"/>
                <xsd:element name="PackageType" type="xsd:string" minOccurs="0"/>
                <xsd:element name="LastLoginTime" type="gmtDateTime" minOccurs="0"/>
            </xsd:sequence>
            <xsd:attribute name="ReqId" type="quantity" use="required"/>
        </xsd:complexType>
    </xsd:element>
    <xsd:element name="LOGOFF">
        <xsd:annotation>
            <xsd:documentation>
================================== LOGOFF ==================================
Vendor Logoff message
============================================================================

            </xsd:documentation>
        </xsd:annotation>
        <xsd:complexType/>
    </xsd:element>
    <xsd:element name="CHNGPWDREQ">
        <xsd:annotation>
            <xsd:documentation>
================================ CHNGPWDREQ ================================
Vendor change password command message
============================================================================

            </xsd:documentation>
        </xsd:annotation>
        <xsd:complexType>
            <xsd:sequence>
                <xsd:element name="Password">
                    <xsd:complexType>
                        <xsd:sequence>
                            <xsd:element name="Encoding">
                                <xsd:complexType>
                                    <xsd:group ref="SingleEncodedData"/>
                                    <xsd:attribute name="Notation" type="xsd:string" use="required"/>
                                </xsd:complexType>
                            </xsd:element>
                        </xsd:sequence>
                    </xsd:complexType>
                </xsd:element>
                <xsd:element name="NewPassword">
                    <xsd:complexType>
                        <xsd:sequence>
                            <xsd:element name="Encoding">
                                <xsd:complexType>
                                    <xsd:group ref="SingleEncodedData"/>
                                    <xsd:attribute name="Notation" type="xsd:string" use="required"/>
                                </xsd:complexType>
                            </xsd:element>
                        </xsd:sequence>
                    </xsd:complexType>
                </xsd:element>
            </xsd:sequence>
            <xsd:attribute name="ReqId" type="quantity" use="required"/>
        </xsd:complexType>
    </xsd:element>
    <xsd:element name="CHNGPWDRESP">
        <xsd:annotation>
            <xsd:documentation>
============================== CHNGPWDRESP =================================
```

```
Vendor change password command response
==========================================================================
            </xsd:documentation>
        </xsd:annotation>
        <xsd:complexType>
            <xsd:sequence>
                <xsd:element ref="Status"/>
            </xsd:sequence>
            <xsd:attribute name="ReqId" type="quantity" use="required"/>
        </xsd:complexType>
    </xsd:element>
    <xsd:element name="FULLRECVYREQ">
        <xsd:annotation>
            <xsd:documentation>
================================ FULLRECVYREQ ================================
Full data recovery command message
==========================================================================
            </xsd:documentation>
        </xsd:annotation>
        <xsd:complexType>
            <xsd:attribute name="ReqId" type="quantity" use="required"/>
        </xsd:complexType>
    </xsd:element>
    <xsd:element name="PARTRECVYREQ">
        <xsd:annotation>

    <xsd:documentation>================================PARTRECVYREQ==================
==============
Full data recovery command message
======================================================================================
            </xsd:documentation>
        </xsd:annotation>
        <xsd:complexType>
            <xsd:sequence>
                <xsd:element name="NewsSeqNo" type="long"/>
            </xsd:sequence>
            <xsd:attribute name="ReqId" type="quantity" use="required"/>
        </xsd:complexType>
    </xsd:element>
    <xsd:element name="RECVYRESP">
        <xsd:annotation>
            <xsd:documentation>
================================= RECVYRESP ==================================
Vendor change password command response
==========================================================================
            </xsd:documentation>
        </xsd:annotation>
        <xsd:complexType>
            <xsd:sequence>
                <xsd:element ref="Status"/>
                <xsd:element name="NoofNewsItem" type="quantity" minOccurs="0"/>
            </xsd:sequence>
            <xsd:attribute name="ReqId" type="quantity" use="required"/>
        </xsd:complexType>
    </xsd:element>
    <xsd:element name="RECVYCOMPLETE">
        <xsd:annotation>
            <xsd:documentation>
================================= RECVYCOMPLETE ==============================
New Recovery completed message
==========================================================================
            </xsd:documentation>
        </xsd:annotation>
        <xsd:complexType>
            <xsd:attribute name="ReqId" type="quantity" use="required"/>
        </xsd:complexType>
    </xsd:element>
    <xsd:element name="PERMISSIONDROP">
        <xsd:annotation>
            <xsd:documentation>
============================== PERMISSIONDROP ================================
```

```
Permission drop message
================================================================================
            </xsd:documentation>
        </xsd:annotation>
        <xsd:complexType>
            <xsd:sequence>
                <xsd:element name="Reason" type="xsd:string"/>
            </xsd:sequence>
        </xsd:complexType>
    </xsd:element>
    <xsd:element name="UPDATEHEADLINE">
        <xsd:annotation>
            <xsd:documentation>
============================== UPDATEHEADLINE ==================================
Headline update message
================================================================================
            </xsd:documentation>
        </xsd:annotation>
        <xsd:complexType>
            <xsd:sequence>
                <xsd:element ref="NewsML"/>
            </xsd:sequence>
            <xsd:attribute name="Type" use="required">
                <xsd:simpleType>
                    <xsd:restriction base="xsd:string">
                        <xsd:enumeration value="ALERT"/>
                        <xsd:enumeration value="FIRSTTAKE"/>
                        <xsd:enumeration value="SUBTAKE"/>
                        <xsd:enumeration value="DELETED"/>
                        <xsd:enumeration value="CANCELLED"/>
                        <xsd:enumeration value="AMENDED"/>
                    </xsd:restriction>
                </xsd:simpleType>
            </xsd:attribute>
            <xsd:attribute name="SeqNo" type="xsd:integer" use="required"/>
        </xsd:complexType>
    </xsd:element>
    <xsd:element name="RECVYHEADLINE">
        <xsd:annotation>
            <xsd:documentation>
============================== RECVYHEADLINE ===================================
Headline update message (Recovery)
================================================================================
            </xsd:documentation>
        </xsd:annotation>
        <xsd:complexType>
            <xsd:sequence>
                <xsd:element ref="NewsML"/>
            </xsd:sequence>
            <xsd:attribute name="Type" use="required">
                <xsd:simpleType>
                    <xsd:restriction base="xsd:string">
                        <xsd:enumeration value="ALERT"/>
                        <xsd:enumeration value="FIRSTTAKE"/>
                        <xsd:enumeration value="SUBTAKE"/>
                        <xsd:enumeration value="CANCELLED"/>
                        <xsd:enumeration value="AMENDED"/>
                    </xsd:restriction>
                </xsd:simpleType>
            </xsd:attribute>
            <xsd:attribute name="SeqNo" type="xsd:integer" use="required"/>
        </xsd:complexType>
    </xsd:element>
    <xsd:element name="STATUSREQ">
        <xsd:annotation>
            <xsd:documentation>
================================= STATUSREQ ====================================
communication status request
================================================================================
        </xsd:documentation>
        </xsd:annotation>
```

```
        <xsd:complexType>
            <xsd:attribute name="ReqId" type="quantity" use="required"/>
        </xsd:complexType>
    </xsd:element>
    <xsd:element name="STATUSRESP">
        <xsd:annotation>
            <xsd:documentation>
================================== STATUSRESP ================================
communication status request response
==============================================================================
        </xsd:documentation>
        </xsd:annotation>
        <xsd:complexType>
            <xsd:attribute name="ReqId" type="quantity" use="required"/>
        </xsd:complexType>
    </xsd:element>
    <xsd:element name="INITREQ">
        <xsd:annotation>
            <xsd:documentation>
================================== INITREQ ===================================
communication status request response
==============================================================================
        </xsd:documentation>
        </xsd:annotation>
        <xsd:complexType>
            <xsd:attribute name="ReqId" type="quantity" use="required"/>
        </xsd:complexType>
    </xsd:element>
    <xsd:element name="INITRESP">
        <xsd:annotation>
            <xsd:documentation>
================================== INITRESP ==================================
Initialization response
==============================================================================
        </xsd:documentation>
        </xsd:annotation>
        <xsd:complexType>
            <xsd:sequence>
                <xsd:element ref="Status"/>
                <xsd:element name="SessionKey" minOccurs="0">
                    <xsd:complexType>
                        <xsd:sequence>
                            <xsd:element name="Encoding">
                                <xsd:complexType>
                                    <xsd:group ref="SingleEncodedData"/>
                                    <xsd:attribute name="Notation" type="xsd:string" use="required"/>
                                </xsd:complexType>
                            </xsd:element>
                        </xsd:sequence>
                    </xsd:complexType>
                </xsd:element>
            </xsd:sequence>
            <xsd:attribute name="ReqId" type="quantity" use="required"/>
        </xsd:complexType>
    </xsd:element>
    <xsd:element name="NDSML">
        <xsd:annotation>
            <xsd:documentation>
================================== NDSML =====================================
NDSML
==============================================================================
        </xsd:documentation>
        </xsd:annotation>
        <xsd:complexType>
            <xsd:sequence>
                <xsd:element ref="MsgHeader"/>
                <xsd:choice>
                    <xsd:element ref="INITREQ"/>
                    <xsd:element ref="INITRESP"/>
                    <xsd:element ref="LOGONREQ"/>
                    <xsd:element ref="LOGONRESP"/>
```

```
                    <xsd:element ref="LOGOFF"/>
                    <xsd:element ref="CHNGPWDREQ"/>
                    <xsd:element ref="CHNGPWDRESP"/>
                    <xsd:element ref="FULLRECVYREQ"/>
                    <xsd:element ref="PARTRECVYREQ"/>
                    <xsd:element ref="RECVYRESP"/>
                    <xsd:element ref="RECVYCOMPLETE"/>
                    <xsd:element ref="PERMISSIONDROP"/>
                    <xsd:element ref="STATUSREQ"/>
                    <xsd:element ref="STATUSRESP"/>
                    <xsd:element ref="UPDATEHEADLINE"/>
                    <xsd:element ref="RECVYHEADLINE"/>

                </xsd:choice>
            </xsd:sequence>
        </xsd:complexType>
    </xsd:element>
</xsd:schema>
```

Appendix B Base64 Encoding and Decoding Algorithms

Base 64 encoding is defined in RFC 1521. The basic concept is described in the following.

The first 6 bits (bits 1-6) are read and then those 6 bits are mapped to 8 bits that correspond to visible ASCII characters. The next 6 bits (bits 7-12) are read and these are mapped to 8 bits using the same mapping procedure. The same mechanism is applied for the next 6 bits (bits 13-18) and again for the next 6 bits (bits 19-24). Once 4 sets of 6 bits (24 bits total) are read, another byte boundary is encountered.

The translation table is as follows:

Input	Output	Input	Output	Input	Output	Input	Output
000000	A	010000	Q	100000	g	110000	w
000001	B	010001	R	100001	h	110001	x
000010	C	010010	S	100010	I	110010	y
000011	D	010011	T	100011	j	110011	z
000100	E	010100	U	100100	k	110100	0
000101	F	010101	V	100101	l	110101	1
000110	G	010110	W	100110	m	110110	2
000111	H	010111	X	100111	n	110111	3
001000	I	011000	Y	101000	o	111000	4
001001	J	011001	Z	101001	p	111001	5
001010	K	011010	a	101010	q	111010	6
001011	L	011011	b	101011	r	111011	7
001100	M	011100	c	101100	s	111100	8
001101	N	011101	d	101101	t	111101	9
001110	O	011110	e	101110	u	111110	+
001111	P	011111	f	101111	v	111111	/
(pad)	=						

When decoding, white space should be ignored. A '=' represents that the encoded file has been padded. If the input file contains a character that is not listed in the table above, is not white space, and is not a '=', then there is an error.

For encoding used in IIS, three bytes of data are read from the input file and then they are encoded as four bytes. When the input file is not a multiple of 3 bytes in length, the following handlings should be followed.

1. If the input file is a multiple of 3 bytes in length.
Then there is no problem. The last read from the file will be three bytes in length.
First encoded byte: 1-6 bits of the input
Second encoded byte: 7-12 bits of the input
Third encoded byte: 13-18 bits of the input
Fourth encoded byte: 19-24 bits of the input

2. If the input file is a multiple of 3 bytes in length plus one.
The last read from the file will be one byte (8 bits) in length.
First encoded byte: 1-6 bits of the input byte
Second encoded byte: 7-8 bits of the input byte + "0000"
Third encoded byte: '='
Fourth encoded byte: '='

3. If the input file is a multiple of 3 bytes in length plus two.
The last read from the file will be two bytes (16 bits) in length.
First encoded byte: 1-6 bits of the input byte
Second encoded byte: 7-12 bits of the input
Third encoded byte: 13-16 bits of the input + "00"
Fourth encoded byte: '='

Appendix C Cryptography in IIS

ENCRYPTION AND DECRYPTION ALGORITHMS

The encryption and decryption algorithms being used in IIS are Triple-DES algorithm with Cyclic Block Chaining mode (3DES-CBC) and PKCS5 Padding.

For password processing, the Vendor terminal receives INITRESP message with session key which is encrypted by IIS symmetric key. The IIS symmetric key is distributed by HKEX-IS to each Vendor. Having got session key, the Vendor terminal sends encrypted password using session key in LOGONREQ message. The same mechanism is used for CHNGPWDREQ message for change of password.

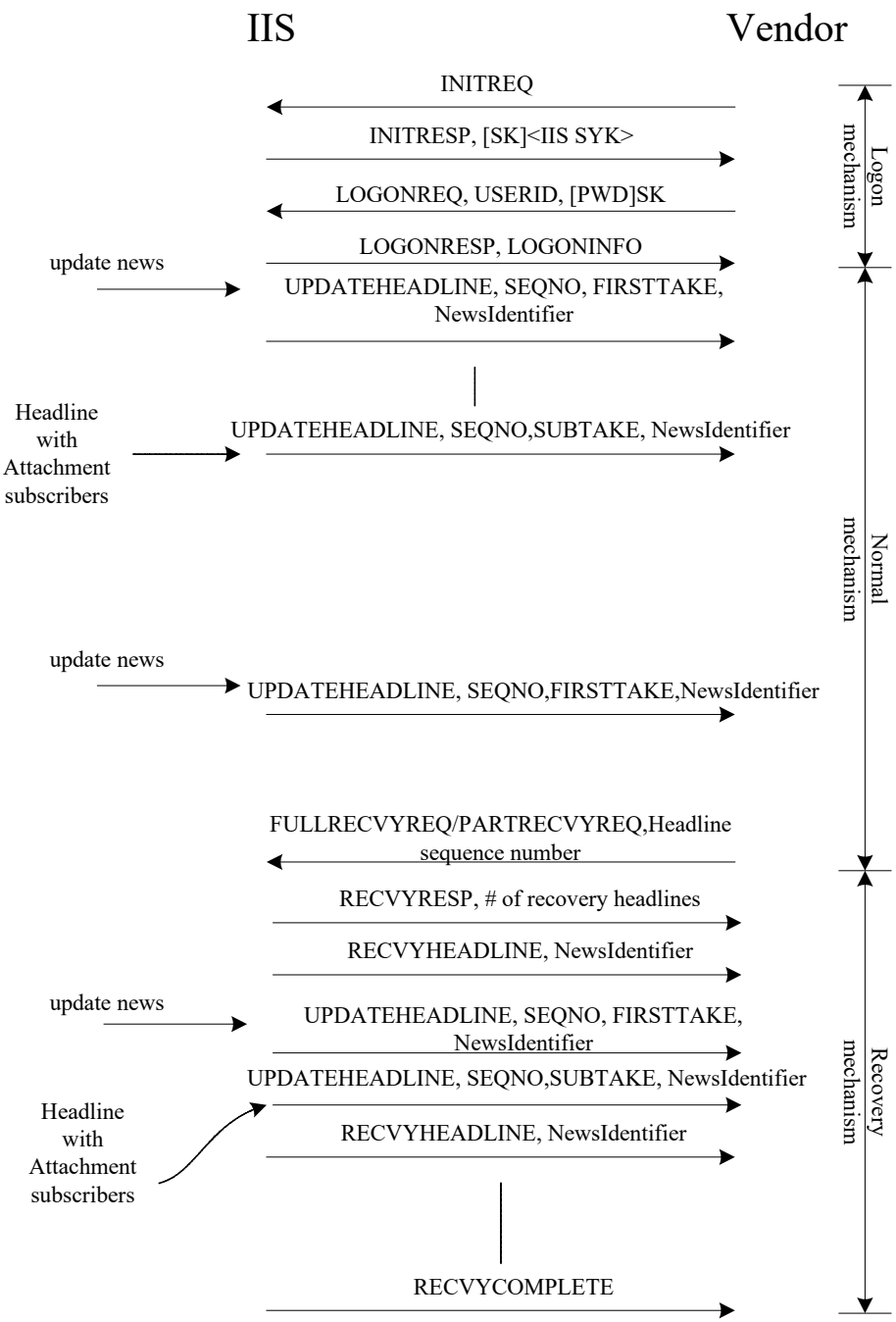
The procedure to obtain plain text session key in INITREQ message is as follows.
1. Decode session key value using Base64 algorithm
2. Decrypt session key value using PK3
3. Encrypt session key value using PK2
4. Decrypt session key value using PK1

The procedure to create encrypted password in LOGONREQ and CHNGPWDREQ messages is in the following.
1. Encrypt password using PK1
2. Decrypt password using PK2
3. Encrypt password using plain text session key value obtained in the above steps

ATTACHMENT INTEGRITY USING MD5

The integrity of the attachment can be verified by calculating hash value of the received attachment using Message Digest 5 against the one coming with the associated headline. MD5 is a hashing algorithm that creates a 128-bit hash value. MD5 algorithm is described in RFC 1321 of IETF.

Appendix D An example of Message Flow Diagram



Appendix E Error Code Definition

Error	Error code	Error Message
INVALID_MESSAGE	90001	Invalid message format
PERMISSION_DROP	90002	Permission is revoked.
SESSION_NOT_ESTABLISHED	90004	Vendor haven't sign on
SERVICE_NOT_ALLOW	90005	No permission to request the service.
DUPLICATE_LOGON	90006	Vendor session had been established.
NEWS_NOT_FOUND	90007	No such headline or headline has been housekept
ATTACHMENT_NOT_FOUND	90008	No such attachment
INCORRECT_VENDOR	90010	Incorrect Vendor identity or password
ATTACHMENT_NOT_READY	90011	The requested attachment is not available for downloading
SERVICE_NOT_AVAILABLE	90012	Service is not available
INVALID_PASSWORD	90013	Invalid Password
SYSTEM BUSY	90014	System Busy

Appendix F Subject Code and Scheme within Descriptive Metadata

There are different kinds of subject code comes within Descriptive Metadata which is identified by the scheme name. Scheme can be headline category, stock code, stock name, market code, expiry date, etc. The following table summarizes the possible types of scheme within subject code.

Scheme	Description
Stock Code	Stock Code of the stock related to the news
Stock Name	Stock Name of the stock related to the news Notes: ▪ In NewsML, the Stock Name will be encoded in Base64 format ▪ For trading news, the stock name field will be empty
Expiry Date	Expiry Date of the news
Headline Category – T1	Code of the News Category representing the Tier 1 announcement headlines – the most representative news category input by the listed issuer Notes: ▪ For trading news and nasdaq, the Headline Category – T1 field will be empty
Headline Category – T2	Code of the announcement Category Code for the Tier 2 headlines in order of their importance. Tier 2 News Categories are other news category also covered by the News input by the listed issuer.
Mkt Code	Market Code of the news

The following table summarizes the possible Market Code of the subject code with scheme **Mkt Code**. The maximum description length for Headline Category is 200 bytes.

Market Code (Scheme=Mkt Code)

Market Code	Description
ALL	All markets
MAIN	Main Board
GEM	GEM Board
NASD	Nasdaq securities
ETS	Extended Trade Securities including “iShares” that is traded during lunch time

Expiry Date (Scheme=Expiry Date)

Format	Description
CCYYMMDD	Current News Expiry Date

Trading News Headline Category (Scheme=Headline Category-T1)*

Tier 1 Headline Category	Chinese Description	Description
EXN	交易所訊息	Trading News issued by the Exchange

* Notes for Trading News Headline Category:

- The news will come with empty Tier 2 Headline Category. All associated Headline Category will be delivered as Tier 1 Headline Category.
- Tier 1 Headline Categories under Trading News Headline Category do not belong to the Headline Categories defined in the Listing Rules for issuer announcements.

Main Broad and GEM Broad Headline Category (defined in the Listing Rules)

Tier 1 Headline Category Code	Tier 2 Headline Category Code	Description	Chinese Description
10000	-	Announcements and Notices	公告及通告
-	-	Connected Transactions	關連交易
10000	11100	Auditors or INEDs Unable to Confirm Matters relating to Continuing Connected Transaction	核數師或獨立非執行董事未能確認有關持續關連交易的事宜
10000	11200	Connected Transaction	關連交易
10000	11300	Continuing Connected Transaction	持續關連交易
10000	11400	Guaranteed Net Tangible Assets or Profits	擔保有形資產淨值或溢利
10000	11500	Waiver in respect of Connected Transaction Requirements	就關連交易規定所授予的豁免
-	-	Corporate Positions and Committees/Corporate Changes	公司狀況變動及委員會／公司變動
10000	12050	Change in Company Website	更改公司網址
10000	12100	Amendment of Constitutional Documents	修訂憲章文件
10000	12150	Change in Auditors	更換核數師
10000	12200	Change in Class Rights	更改不同類別股份的權利
10000	12250	Change in Compliance Adviser	更換合規顧問
10000	12300	Change in Compliance Officer	更換監察主任
10000	12350	Change in Directors or of Important Executive Functions or Responsibilities	更換董事或重要行政職能或職責的變更
10000	12400	Change in Financial Year End	更改財政年度結算日期
10000	* 12450	Change in Qualified Accountant	更換合資格會計師
10000	12500	Change in Registered Address or Office, Registered Place of Business in HK or Agent for Service of Process in HK	更改註冊地址或辦事處、香港業務的註冊地或香港接收法律程序文件代表

10000	12550	Change in Company Secretary	更換公司秘書
10000	12600	Change in Supervisors	更換監事
10000	12650	Change of Audit Committee Member	更換審核委員會成員
10000	12700	Change of Company Name	更改公司名稱
10000	12750	Non-compliance with Audit Committee Requirements	未能符合審核委員會的規定
10000	12800	Non-compliance with Compliance Officer Requirements	未能符合監察主任的規定
10000	12850	Non-compliance with INED Requirements or INED Failing to Meet Independence Guidelines	未能符合獨立非執行董事的規定或獨立非執行董事未能符合獨立性指引
10000	* 12900	Non-compliance with Qualified Accountant Requirements	未能符合合資格會計師的規定
10000	12950	Change in a Director's or Supervisor's Biographical Details	董事或監事履歷詳情的變更
10000	12951	Change in Chief Executive	更換行政總裁
10000	12952	List of Directors and their Role and Function	董事名單和他們的地位和作用
10000	12953	Non-compliance with Remuneration Committee Requirements	未能符合薪酬委員會的規定
10000	12954	Terms of Reference of the Audit Committee	審核委員會的職權範圍
10000	12955	Terms of Reference of the Nomination Committee	提名委員會的職權範圍
10000	12956	Terms of Reference of the Remuneration Committee	薪酬委員會的職權範圍
10000	12957	Change of Remuneration Committee Member	更換薪酬委員會成員
10000	12958	Terms of Reference of Other Board Committees	其他董事會轄下之委員會的職權範圍
10000	12959	Change in Share Registrar/Transfer Agent	更換股份過戶登記處／登記代理
-	-	Financial Information	財務資料
10000	13100	Advance to an Entity	向實體提供墊款
10000	13150	Date of Board Meeting	董事會召開日期
10000	13200	Delay in Results Announcement	延遲發表業績公告
10000	13250	Dividend or Distribution	股息或分派

10000	13300	Final Results	末期業績
10000	13350	Financial Assistance and/or Guarantee to Affiliated Company	向聯屬公司提供財務資助及／或作出擔保
10000	13400	Interim Results	中期業績
10000	13450	Net Asset Value	資產淨值
10000	13500	Profit Warning	盈利警告
10000	13550	Modified Report by Auditors	核數師發出「非標準報告」
10000	13600	Quarterly Results	季度業績
10000	13650	Results of a Subsidiary	附屬公司的業績
10000	13700	Revision of Information in Published Preliminary Results	修訂已刊發初步業績的資料
10000	13750	Prior Period Adjustments due to Correction of Material Errors	修正重大錯誤而作出的前期調整
10000	13800	Revision of Published Financial Statements and Reports	修改已刊發的財務報表及報告
-	-	Meetings/Voting	會議／表決
10000	14100	Change of Voting Intention	更改表決意向
10000	14200	Material Information after Issue of Circular	在發出通函後的重大資料
10000	14300	Nomination of Director by Shareholder	由股東提名董事
10000	14400	Notice of AGM	股東周年大會通告
10000	14500	Notice of EGM/SGM	股東特別大會通告
10000	14600	Re-election or Appointment of Director subject to Shareholders' Approval	在股東批准的情況下重選或委任董事
10000	14700	Results of AGM	股東周年大會的結果
10000	14800	Results of EGM/SGM	股東特別大會的結果
10000	* 14900	Results of Voting by Poll	投票表決的結果
10000	15000	Change in Auditors subject to Shareholders' Approval	在股東批准的情況下更換核數師
-	-	New Listings (Listed Issuers/New Applicants)	新上市（上市發行人／新申請人）

10000	15100	Allotment Results	配發結果
10000	15200	Formal Notice	正式通告
10000	15300	Listing of Securities by way of Introduction	以介紹形式上市的證券
10000	15400	Striking Price on Offer for Subscription or for Sale by Tender	供認購或投標發售的行使價
10000	15500	Supplemental Information regarding IPO	有關首次公開招股的補充資料
10000	15600	Transfer of listing from GEM to Main Board	由 GEM 轉往主板上市
10000	15700	Mixed Media Offer	混合媒體要約
-	-	Notifiable Transactions	須予公布的交易
10000	16100	Delay in Completion	在完成須予公布的交易方面出現延誤
10000	16200	Disclosable Transaction	須予披露的交易
10000	16300	Major Transaction	主要交易
10000	16400	Reverse Takeover	反收購
10000	16500	Share Transaction	股份交易
10000	16600	Termination of Transaction	終止交易
10000	16700	Variation to Terms	條款上的更改 circular
10000	16800	Very Substantial Acquisition	非常重大的收購事項
10000	16900	Very Substantial Disposal	非常重大的出售事項
-	-	Reorganisation/Change in Shareholding/Major Changes/Public Float/Listing Status	重組／股權變動／主要改動／公眾持股量／上市地位
10000	17100	Announcement by Offeree Company under the Takeovers Code	《收購守則》所指的受要約公司刊發的公告
10000	17150	Announcement by Offeror Company under the Takeovers Code	《收購守則》所指的要約公司刊發的公告
10000	17200	Change in Shareholding	股權出現變動
10000	17250	Charging or Pledging of Shares by Shareholder	股東抵押股份
10000	17300	Concentration of Shareholdings	股權集中

10000	17350	Dealing in Securities by Director where Otherwise Prohibited under Model Code	董事於《標準守則》所載的禁售期內買賣證券
10000	* 17400	Fundamental Change in Principal Business Activities	主要業務活動出現根本轉變
10000	17450	Group Restructuring or Scheme of Arrangement	集團重組或協議安排
10000	17500	Lack of Open Market in Securities	證券缺乏公開市場
10000	17550	Listing on Overseas Exchange or Securities Market	於海外交易所或證券市場上市
10000	17600	Privatisation/Withdrawal or Cancellation of Listing of Securities	私有化／撤銷或取消證券上市
10000	17650	Resumption	復牌
10000	17700	Spin-off	分拆
10000	17750	Sufficiency of Assets and/or Operations and/or Issuer becoming Cash Company	資產充足度及／或業務充足度及／或發行人成為現金資產公司
10000	17800	Sufficiency of Public Float	公眾持股量充足度
10000	17850	Suspension	停牌
10000	17900	Winding Up and Liquidation of Issuer, its Holding Company or Major Subsidiary	發行人、其控股公司或主要附屬公司結束營業及清盤
10000	17950	Change in Principal Business Activities	主要業務活動出現轉變
10000	17960	Trading Halt	短暫停牌
-	-	Securities/Share Capital	證券／股本
10000	18100	Announcement pursuant to Code on Share Buy-backs	根據《公司股份回購守則》發出的公告
10000	18120	Capital Reorganisation	資本重組
10000	18140	Capitalisation Issue	資本化發行
10000	18160	Change in Board Lot Size	更改每手買賣單位
10000	18180	Change in Terms of Securities or Rights attaching to Securities	更改證券條款或隨附於證券的權利
10000	18200	Change of Dividend Payment Date	更改股息支付日期
10000	18220	Closure of Books or Change of Book Closure Period	暫停辦理過戶登記手續或更改暫停辦理過戶日期

10000	18240	Consideration Issue	代價發行
10000	18260	Conversion of Securities	轉換證券
10000	18280	Intention to Sell Shares of Untraceable Member	出售未能聯絡到的股東股份的意向
10000	18300	Issue of Convertible Securities	發行可轉換證券
10000	18320	Issue of Debt Securities	發行債務證券
10000	18340	Issue of Preference Shares	發行優先股
10000	18360	Issue of Securities by Major Subsidiary	主要附屬公司發行證券
10000	18380	Issue of Shares under a General Mandate	根據一般性授權發行股份
10000	18400	Issue of Shares under a Specific Mandate	根據特定授權發行股份
10000	18420	Issue of Warrants	發行權證
10000	18440	Movements in Issued Share Capital	已發行股本變動
10000	18460	Open Offer	公開招股
10000	18480	Placing	配售
10000	18500	Rights Issue	供股
10000	18520	Share Option Scheme	股份期權計劃
10000	18540	Trading Arrangements (other than Change in Board Lot Size)	交易安排（更改每手買賣單位除外）
-	-	Miscellaneous	雜項
10000	19100	Breach of Loan Agreement	違反借貸協議
10000	19150	Clarification of News or Reports – Qualified	澄清新聞報道或報告 – 附帶意見
10000	19200	Clarification of News or Reports – Standard or Super	澄清新聞報道或報告 – 標準內容或超級內容
10000	19250	Delay in Dispatch of Circular or other Document	延遲發送通函或其他文件
10000	19300	Loan Agreement with Specific Performance Covenant	附有特定履行契諾的借貸協議
10000	19350	Matters relating to Options	有關期權事宜
10000	19400	Matters relating to Collective Investment Schemes	有關集體投資計劃事宜

10000	19450	Other (before 1 April 2014)	其他（２０１４年４月１日前）
10000	19500	Overseas Regulatory Announcement (before 1 April 2014)	海外監管公告（２０１４年４月１日前）
10000	** 19550	Price-Sensitive Information	股價敏感資料
10000	19600	Unusual Price/Turnover Movements – Qualified	不尋常價格／成交量變動 – 附帶意見
10000	19650	Unusual Price/Turnover Movements – Standard or Super	不尋常價格／成交量變動 – 標準內容或超級內容
10000	19700	Mining Activities Undertaken by Listed Issuers	上市發行人所從事的礦業活動
10000	19750	Inside Information	內幕消息
10000	19760	Other – Business Update	其他－業務發展最新情況
10000	19770	Other – Corporate Governance Related Matters	其他－企業管治相關事宜
10000	19780	Other – Litigation	其他－訴訟
10000	19790	Other – Miscellaneous	其他－雜項
10000	19800	Other – Trading Update	其他－營運業績最新情況
10000	19810	Overseas Regulatory Announcement – Board/Supervisory Board Resolutions	海外監管公告－董事會／監事會決議
10000	19820	Overseas Regulatory Announcement – Business Update	海外監管公告－業務發展最新情況
10000	19830	Overseas Regulatory Announcement – Corporate Governance Related Matters	海外監管公告－企業管治相關事宜
10000	19840	Overseas Regulatory Announcement – Issue of Securities and Related Matters	海外監管公告－證券發行及相關事宜
10000	19850	Overseas Regulatory Announcement – Other	海外監管公告－其他
10000	19860	Overseas Regulatory Announcement – Trading Update	海外監管公告－營運業績最新情況
20000	-	Circulars	通函
-	-	Connected Transaction	關連交易
20000	21100	Connected Transaction	關連交易
20000	21200	Continuing Connected Transaction	持續關連交易
-	-	Corporate Positions and Committees/Corporate Changes	公司狀況變動及委員會／公司變動

20000	22100	Amendment of Constitutional Documents	修訂憲章文件
-	-	Meetings/Voting	會議／表決
20000	23100	Change of Voting Intention	更改表決意向
20000	23200	Material Information after Issue of Circular	發出通函後的重大資料
20000	23300	Nomination of Director by Shareholder	由股東提名董事
20000	23400	Re-election or Appointment of Director subject to Shareholders' Approval	在股東批准的情況下重選或委任董事
20000	23500	Change in Auditors subject to Shareholders' Approval	在股東批准的情況下更換核數師
-	-	Notifiable Transactions	須予公布的交易
20000	* 24100	Disclosable Transaction	須予披露的交易
20000	24200	Major Transaction	主要交易
20000	24300	Reverse Takeover	反收購
20000	24400	Very Substantial Acquisition	非常重大的收購事項
20000	24500	Very Substantial Disposal	非常重大的出售事項
-	-	Reorganisation/Change in Shareholding/Major Changes/Public Float/Listing Status	重組／股權改動／主要改動／公眾持股量／上市地位
20000	25100	Document issued by Offeree Company under the Takeovers Code	《收購守則》所指的受要約公司發出的文件
20000	25200	Document issued by Offeror Company under the Takeovers Code	《收購守則》所指的要約公司發出的文件
20000	25300	Fundamental Change in Principal Business Activities	主要業務活動出現根本轉變
20000	25400	Privatisation/Withdrawal of Listing of Securities	私有化／撤銷證券上市
20000	25500	Proposal of Mineral Company to Explore for Natural Resources as Extension to or Change from Existing Activities	有關礦務公司開發天然資源用以拓展或更改現有活動的建議
20000	25600	Spin-off	分拆
-	-	Securities/Share Capital	證券／股本
20000	26100	Capitalisation Issue	資本化發行

20000	26150	Change in Terms of Securities or Rights attaching to Securities	更改證券條款或隨附於證券的權利
20000	26200	Document issued pursuant to Code on Share Buy-backs	根據《公司股份回購守則》刊發的文件
20000	26250	Exchange or Substitution of Securities	交換證券或取代原證券
20000	26300	Explanatory Statement for Repurchase of Shares	回購股份的說明函件
20000	26350	General Mandate	一般性授權
20000	26400	Issue of Convertible Securities	發行可轉換證券
20000	26450	Issue of Debt Securities	發行債務證券
20000	26500	Issue of Preference Shares	發行優先股
20000	26550	Issue of Securities by Major Subsidiary	主要附屬公司發行股份
20000	26600	Issue of Securities within 6 Months of Listing	於上市後六個月內發行證券
20000	26650	Issue of Shares	發行股份
20000	26700	Issue of Warrants	發行權證
20000	26750	Open Offer	公開招股
20000	26800	Rights Issue	供股
20000	26850	Share Option Scheme	股份期權計劃
-	-	Miscellaneous	雜項
20000	27100	Matters relating to Collective Investment Schemes	有關集體投資計劃事宜
20000	27900	Other	其他
30000	-	Listing Documents	上市文件
30000	30100	Authorised Collective Investment Scheme	認可集體投資計劃
30000	30200	Capitalisation Issue	資本化發行
30000	30300	Deemed New Listing under the Listing Rules	按《上市規則》規定視為新上市
30000	30400	Exchange or Substitution of Securities	交換證券或取代原證券
30000	30500	Introduction	介紹

30000	30600	Offer for Sale	發售現有證券
30000	30700	Offer for Subscription	發售以供認購
30000	30800	Open Offer	公開招股
30000	30900	Other	其他
30000	31000	Placing of Securities of a Class New to Listing	配售上市後的新證券類別
30000	31100	Rights Issue	供股
30000	31200	Supplementary Listing Document	補充上市文件
40000	-	Financial Statements/ESG Information	財務報表/環境、社會及管治資料的標題類別
40000	40100	Annual Report	年報
40000	40200	Interim/Half-Year Report	中期／半年度報告
40000	40300	Quarterly Report	季度報告
40000	40400	Environmental, Social and Governance Information/Report	環境、社會及管治資料/報告
70000	-	Debt and Structured Products	債券及結構性產品
-	-	Callable Bull/Bear Contracts (CBBC)	牛熊證
70000	72500	Additional information - Exotic CBBC	附加資料 - 非標準型牛熊證
70000	72660	Adjustment to Terms and Conditions – CBBC	調整條款及細則 – 牛熊證
70000	73500	Base Listing Document - CBBC	基礎上市文件 - 牛熊證
70000	71500	Daily Trading Report – CBBC	每日交易報告 - 牛熊證
70000	72550	Expiry Announcement - CBBC	到期公告 - 牛熊證
70000	72670	Inside Information – CBBC	內幕消息 – 牛熊證
70000	72600	Launch Announcement - CBBC	發行公告 - 牛熊證
70000	72680	Liquidity Provision Service – CBBC	流通量供應服務 – 牛熊證
70000	72690	Market Disruption Event – CBBC	市場受阻事件 – 牛熊證
70000	72650	Other - CBBC	其他 - 牛熊證
70000	71600	Pre-Listing Trading Report - CBBC	上市前的交易報告 - 牛熊證

70000	72700	Resumption – CBBC	復牌 - 牛熊證
70000	73600	Supplemental Listing Document - CBBC	補充上市文件 - 牛熊證
70000	72710	Suspension – CBBC	停牌 - 牛熊證
70000	72720	Trading Halt – CBBC	短暫停牌 - 牛熊證
70000	72730	Withdrawal of Listing – CBBC	撤銷上市 - 牛熊證
-	-	Derivative Warrants (DW)	衍生權證
70000	72100	Additional information - Exotic DW	附加資料 - 非標準型衍生權證
70000	72740	Adjustment to Terms and Conditions - DW	調整條款及細則 – 衍生權證
70000	73100	Base Listing Document – DW	基礎上市文件 - 衍生權證
70000	71100	Daily Trading Report – DW	每日交易報告 - 衍生權證
70000	72150	Expiry Announcement - DW	到期公告 - 衍生權證
70000	72750	Inside Information – DW	內幕消息 – 衍生權證
70000	72200	Launch Announcement - DW	發行公告 - 衍生權證
70000	72760	Liquidity Provision Service – DW	流通量供應服務 – 衍生權證
70000	72770	Market Disruption Event – DW	市場受阻事件 – 衍生權證
70000	72250	Other - DW	其他 - 衍生權證
70000	71200	Pre-Listing Trading Report – DW	上市前的交易報告 - 衍生權證
70000	72780	Resumption – DW	復牌 - 衍生權證
70000	73200	Supplemental Listing Document – DW	補充上市文件 - 衍生權證
70000	72790	Suspension – DW	停牌 - 衍生權證
70000	72800	Trading Halt – DW	短暫停牌 - 衍生權證
70000	72810	Withdrawal of Listing – DW	撤銷上市 - 衍生權證
-	-	Equity Linked Instruments (ELI)	股票掛鈎票據
70000	72300	Additional information - Exotic ELI	附加資料 - 非標準型股票掛鈎票據
70000	72820	Adjustment to Terms and Conditions – ELI	調整條款及細則 – 股票掛鈎票據

70000	73300	Base Listing Document - ELI	基礎上市文件 - 股票掛鈎票據
70000	71300	Daily Trading Report - ELI	每日交易報告 - 股票掛鈎票據
70000	72350	Expiry Announcement - ELI	到期公告 - 股票掛鈎票據
70000	72830	Inside Information – ELI	內幕消息 – 股票掛鈎票據
70000	72400	Launch Announcement - ELI	發行公告 - 股票掛鈎票據
70000	72840	Liquidity Provision Service – ELI	流通量供應服務 – 股票掛鈎票據
70000	72850	Market Disruption Event – ELI	市場受阻事件 – 股票掛鈎票據
70000	72450	Other - ELI	其他 - 股票掛鈎票據
70000	71400	Pre-Listing Trading Report - ELI	上市前的交易報告 - 股票掛鈎票據
70000	72860	Resumption – ELI	復牌 - 股票掛鈎票據
70000	73400	Supplemental Listing Document - ELI	補充上市文件 - 股票掛鈎票據
70000	72870	Suspension – ELI	停牌 - 股票掛鈎票據
70000	72880	Trading Halt – ELI	短暫停牌 - 股票掛鈎票據
70000	72890	Withdrawal of Listing – ELI	撤銷上市 - 股票掛鈎票據
-	-	Information regarding Structured Products Issuers	結構性產品發行人
70000	72900	Corporate Information – Structured Products Issuer	公司資料 - 結構性產品發行人
70000	72910	Credit Rating – Structured Products Issuer	信貸評級 - 結構性產品發行人
70000	72920	Financial Disclosure or Report – Structured Products Issuer	財務披露或報告 - 結構性產品發行人
70000	72930	Inside Information – Structured Products Issuer	內幕消息 - 結構性產品發行人
70000	72940	Other – Structured Products Issuer	其他 - 結構性產品發行人
-	-	Debt Securities	債務證券
70000	72950	Adjustment to Terms and Conditions – Debt Securities	調整條款及細則 - 債務證券
70000	72960	Financial Report – Debt Securities	財務報告 - 債務證券
70000	74100	Formal Notice – Debt Securities	上市通告 -債務證券
70000	72970	Inside Information – Debt Securities	內幕消息 - 債務證券

70000	75300	Issuer-Specific Report- Debt Securities	發行人特定報告 -債務證券
70000	75100	Offering Circular and Pricing Supplement – Debt Securities	發行通函或定價補充文件 - 債務證券
70000	74200	Other - Debt Securities	其他 - 債務證券
70000	74300	Overseas Regulatory Announcement – Debt Securities	海外監管公告- 債務證券
70000	75200	Prospectus - Debt Securities	招股章程 - 債務證券
70000	72980	Redemption of Repurchase – Debt Securities	贖回或購回 - 債務證券
70000	72990	Resumption - Debt Securities	復牌 - 債務證券
70000	73000	Suspension - Debt Securities	停牌 - 債務證券
70000	73010	Trading Halt - Debt Securities	短暫停牌 - 債務證券
70000	73020	Withdrawal of Listing - Debt Securities	撤銷上市- 債務證券
-	-	Debt Issuance Programmes	債務證券發行計劃
70000	76100	Financial Report – Debt Issuance Programmes	財務報告 – 債務證券發行計劃
70000	76200	Formal Notice – Debt Issuance Programmes	上市通告 – 債務證券發行計劃
70000	76300	Inside Information — Debt Issuance Programmes	內幕消息 — 債務證券發行計劃
70000	76400	Issuer-Specific Report — Debt Issuance Programmes	發行人特定報告 — 債務證券發行計劃
70000	76500	Offering Circular — Debt Issuance Programmes	發行通函 — 債務證券發行計劃
70000	76600	Other — Debt Issuance Programmes	其他 — 債務證券發行計劃
70000	76700	Overseas Regulatory Announcement — Debt Issuance Programmes	海外監管公告 — 債務證券發行計劃
52000	-	Proxy Forms	委任代表表格
81000	-	Trading Information of Leveraged and Inverse Products	槓桿及反向產品的交易資料
90000	-	Regulatory Announcement & News	監管者發出的公告及消息
91000	-	Application Proofs and Post Hearing Information Packs or PHIPs	申請版本及聆訊後資料集
91000	91100	Post Hearing Information Packs or PHIPs or related materials	聆訊後資料集或相關材料

91000	91200	Application Proofs or related materials	申請版本或相關材料
80000	-	Trading Information of Exchange Traded Funds	交易所買賣基金的交易資料
50000	-	Next Day Disclosure Returns	翌日披露報表
50000	50100	Share Buyback	股份購回
50000	50200	Others	其他
* 51000	-	Share Buyback Reports	股份購回報告
51500	-	Monthly Returns	月報表
53000	-	Company Information Sheet (GEM)	公司資料報表（GEM）
54000	-	Constitutional Documents	憲章文件
55000	-	Takeovers Code – dealing disclosures	合併守則- 交易披露
MISC	MISC	Miscellaneous	雜項

*** Headline ceased to be used since 1 January 2009**
**** Headline ceased to be used since 1 January 2013**
The code “MISC” under both Tier 1 and Tier 2 headline category does not belong to Headline Categories of issuer announcements defined in the Listing Rules.

Below is the example that illustrates the structure of <Descriptive Metadata> tag:

```
<DescriptiveMetadata>
        <Language FormalName=”[X]*” />
        <SubjectCode>


                <!-- Announcement Category (Tier 1) of the news -->
                <SubjectMatter FormalName=”11000” Scheme=”Headline Category-T1”/>

                <!-- Announcement Category (Tier 2) of the news -->
                <SubjectMatter FormalName=”13000” Scheme=”Headline Category-T2”/>
                <SubjectMatter FormalName=”12000” Scheme=”Headline Category-T2”/>
                <SubjectMatter FormalName=”14000” Scheme=”Headline Category-T2”/>


                <!-- Market Code of the news -->
                <SubjectMatter FormalName=”MAIN” Scheme=”Mkt Code”/>

                <!-- Expiry Date of the news -->
                <SubjectMatter FormalName=”20031203” Scheme=”Expiry Date”/>

                <!-- Stock Information for first stock related to this news -->
                <SubjectMatter FormalName="00013” Scheme=”Stock Code”/>
                <SubjectMatter FormalName="STOCK NAME FOR 00013” Scheme=”Stock Name”/>

                <SubjectMatter FormalName="00383” Scheme=”Stock Code”/>
                <SubjectMatter FormalName="STOCK NAME FOR 00383” Scheme=”Stock Name”/>

        </SubjectCode>
</DescriptiveMetadata>
```

Appendix G MIME TYPE – FILE EXTENSION MAPPING

The mapping below allows the Vendors to find out the attachments file extension from a MIME TYPE. For an attachment without a specific MIME TYPE, a special MIME TYPE expressed as UNKNOWN/[file extension] will be used instead.

MIME TYPE	File Extension
X-WORLD/X-3DMF	3DMF
AUDIO/X-MPEG	ABS
APPLICATION/POSTSCRIPT	AI
AUDIO/X-AIFF	AIF
AUDIO/X-AIFF	AIFC
AUDIO/X-AIFF	AIFF
APPLICATION/X-COSMOBUILDER	ANO
APPLICATION/ASTOUND	ASN
APPLICATION/X-ASAP	ASP
AUDIO/BASIC	AU
VIDEO/X-MSVIDEO	AVI
APPLICATION/X-OLESCRIPT	AXS
APPLICATION/X-BCPIO	BCPIO
APPLICATION/OCTET-STREAM	BIN
IMAGE/X-MS-BMP	BMP
IMAGE/X-SGI-BW	BW
TEXT/PLAIN	C
TEXT/PLAIN	C++
IMAGE/X-CALS	CAL
TEXT/PLAIN	CC
APPLICATION/CCV	CCV
IMAGE/CGM	CGM
IMAGE/X-CMX	CMX
APPLICATION/X-CPIO	CPIO
APPLICATION/X-CSH	CSH
TEXT/CSS	CSS
APPLICATION/X-DIRVIEW	DIR
APPLICATION/MSWORD	DOC
APPLICATION/MSWORD	DOCX
IMAGE/X-MGX-DSF	DSF
APPLICATION/X-DVI	DVI
DRAWING/X-DWF	DWF
IMAGE/VND.DWG	DWG
IMAGE/VND.DXF	DXF
APPLICATION/POSTSCRIPT	EPS
IMAGE/X-EPS	EPSF
IMAGE/X-EPS	EPSI
AUDIO/ECHOSPEECH	ES
APPLICATION/ENVOY	EVY
APPLICATION/OCTET-STREAM	EXE
APPLICATION/X-FAX-MANAGER	FAXMGR
APPLICATION/X-FAX-MANAGER-JOB	FAXMGRJOB
APPLICATION/FRACTALS	FIF
APPLICATION/X-FRAMEMAKER	FM

MIME TYPE	File Extension
APPLICATION/X-FRAMEMAKER	FRAME
APPLICATION/X-FRAMEMAKER	FRM
IMAGE/G3FAX	G3F
IMAGE/GIF	GIF
APPLICATION/X-GTAR	GTAR
TEXT/PLAIN	H
APPLICATION/HDF	HDF
APPLICATION/MSHELP	HLP
APPLICATION/MAC-BINHEX40	HQX
TEXT/HTML	HTM
TEXT/HTML	HTML
APPLICATION/FASTMAN	ICC
X-CONFERENCE/X-COOLTALK	ICE
APPLICATION/X-ICONBOOK	ICNBK
IMAGE/IEF	IEF
APPLICATION/IGES	IGS
APPLICATION/X-INSIGHT	INS
APPLICATION/X-INSIGHT	INSIGHT
APPLICATION/X-INSTALL	INST
APPLICATION/X-INPERSON-CALL	IPCALL
APPLICATION/X-INVENTOR	IV
IMAGE/JPEG	JPE
IMAGE/JPEG	JPEG
IMAGE/JPEG	JPG
TEXT/JAVASCRIPT	JS
APPLICATION/X-LATEX	LATEX
APPLICATION/X-ENTERLICENSE	LIC
TEXT/JAVASCRIPT	LS
APPLICATION/MATHEMATICA	MA
APPLICATION/X-MAILFOLDER	MAIL
APPLICATION/X-TROFF-MAN	MAN
APPLICATION/MBEDLET	MBD
APPLICATION/X-TROFF-ME	ME
APPLICATION/X-PDF	MIF
IMAGE/X-CALS	MIL
X-MUSIC/X-MIDI	MMID
TEXT/JAVASCRIPT	MOCHA
VIDEO/QUICKTIME	MOV
VIDEO/X-SGI-MOVIE	MOVIE
AUDIO/X-MPEG2	MP2A
VIDEO/MPEG2	MP2V
AUDIO/X-MPEG	MPA
AUDIO/X-MPEG2	MPA2
APPLICATION/MSPROJECT	MPC
VIDEO/MPEG	MPE
VIDEO/MPEG	MPEG
AUDIO/X-MPEG	MPEGA
VIDEO/MPEG	MPG
APPLICATION/MSPROJECT	MPP
APPLICATION/MSPROJECT	MPT

MIME TYPE	File Extension
VIDEO/MPEG2	MPV2
APPLICATION/MSPROJECT	MPW
APPLICATION/MSPROJECT	MPX
APPLICATION/X-TROFF-MS	MS
X-MODEL/X-MESH	MSH
APPLICATION/X-DOS_MS_WORD	MSW
APPLICATION/ODA	ODA
APPLICATION/X-OLEOBJECT	ODS
X-FORM/X-OPENSCAPE	OPP
APPLICATION/X-P3D	P3D
APPLICATION/X-NS-PROXY-AUTOCONFIG	PAC
IMAGE/X-PORTABLE-BITMAP	PBM
IMAGE/X-PHOTO-CD	PCD
APPLICATION/X-PCN	PCN
APPLICATION/PDF	PDF
IMAGE/X-PORTABLE-GRAYMAP	PGM
IMAGE/X-PICT	PICT
APPLICATION/X-PERL	PL
IMAGE/X-PNG	PNG
IMAGE/X-PORTABLE-ANYMAP	PNM
APPLICATION/MSPOWERPOINT	POT
APPLICATION/X-PPAGES	PP
APPLICATION/X-PPAGES	PPAGES
IMAGE/X-PORTABLE-PIXMAP	PPM
APPLICATION/MSPOWERPOINT	PPS
APPLICATION/MSPOWERPOINT	PPT
APPLICATION/MSPOWERPOINT	PPZ
APPLICATION/POSTSCRIPT	PS
VIDEO/QUICKTIME	QT
APPLICATION/X-PN-REALAUDIO	RA
APPLICATION/X-RAD-POWERMEDIA	RAD
APPLICATION/X-PN-REALAUDIO	RAM
IMAGE/X-CMU-RASTER	RAS
IMAGE/RGB	RGB
IMAGE/X-SGI-RGBA	RGBA
APPLICATION/X-PN-REALAUDIO-PLUGIN	RM
APPLICATION/X-TROFF	ROFF
APPLICATION/X-PN-REALAUDIO-PLUGIN	RPM
APPLICATION/RTF	RTF
APPLICATION/X-SHOWCASE	SC
APPLICATION/X-STUFFIT	SEA
IMAGE/X-SGI-RGBA	SGI
APPLICATION/X-SGI-LPR	SGI-LPR
APPLICATION/X-SHAR	SHAR
APPLICATION/X-SHOWCASE	SHO
APPLICATION/X-SHOWCASE	SHOW
APPLICATION/X-SHOWCASE	SHOWCASE
APPLICATION/X-STUFFIT	SIT
APPLICATION/VND.KOAN	SKP
APPLICATION/X-SHOWCASE	SLIDES

MIME TYPE	File Extension
AUDIO/BASIC	SND
APPLICATION/FUTURESPLASH	SPL
APPLICATION/X-WAIS-SOURCE	SRC
APPLICATION/VND.SVD	SVD
IMAGE/VND.SVF	SVF
X-WORLD/X-SVR	SVR
APPLICATION/X-TROFF	T
TEXT/X-SPEECH	TALK
APPLICATION/X-TAR	TAR
APPLICATION/X-TARDIST	TARDIST
APPLICATION/X-TCL	TCL
APPLICATION/X-TEX	TEX
APPLICATION/X-TEXINFO	TEXI
APPLICATION/X-TEXINFO	TEXINFO
IMAGE/TIFF	TIF
IMAGE/TIFF	TIFF
APPLICATION/X-TROFF	TR
TEXT/PLAIN	TXT
APPLICATION/X-USTAR	USTAR
APPLICATION/OCTET-STREAM	UU
APPLICATION/VIS5D	V5D
APPLICATION/X-ANNOTATOR	VB
VIDEO/VDO	VDO
VIDEO/VIVO	VIV
AUDIO/VOXWARE	VOX
X-WORLD/X-VRML	VRML
X-WORLD/X-VREAM	VRW
WORKBOOK/FORMULAONE	VTS
AUDIO/X-WAV	WAV
APPLICATION/X-WEBBASIC	WBA
X-SCRIPT/X-WFXCLIENT	WFX
IMAGE/WAVELET	WI
APPLICATION/X-WINGZ	WKZ
X-WORLD/X-VRML	WRL
APPLICATION/X-WAIS-SOURCE	WSRC
X-WORLD/X-WVR	WVR
IMAGE/X-XBITMAP	XBM
APPLICATION/X-DOS_MS_EXCEL	XL
APPLICATION/MSEXCEL	XLC
APPLICATION/MSEXCEL	XLL
APPLICATION/MSEXCEL	XLM
APPLICATION/MSEXCEL	XLS
APPLICATION/MSEXCEL	XLSX
APPLICATION/MSEXCEL	XLW
IMAGE/X-XWINDOWDUMP	XWD
APPLICATION/ZIP	ZIP
APPLICATION/X-ZTARDIST	ZTARDIST

Appendix H Guideline on reading the IIS files provided under Contingency Arrangement

As described in Section 3.8, IIS Vendors will be provided with a download link for a file with all issuer documents stated at section Main Broad and GEM Broad Headline Category of appendix F released on the HKEXnews website on the failure day, together with a CSV mapping file, in case IIS has service disruption and cannot be resumed before mid-night of the failure day. Vendors should read this guideline for retrieving IIS news from the aforesaid file provided.

All news attachments will be stored under a folder in format yyyy\mmdd, where yyyymmdd is the release date for the news. If a news is on 12 Aug 2019, the folder name will be 2019\0812.

Essential news information associated with the attachment file will be provided in three separate CSV format files, which represent different tables containing different kinds of information, including

i) News header information such as news attachment file names, market code, Expiry Date, etc.
ii) Related stock codes information for each news found in the CSV file containing News header information
iii) Tier-2 codes information for each news found in the CSV file containing News header information.

Details of the three CSV files will be listed below:

- CSV file for News Header Table (example file name: 20190812_news_hdr.csv)

  It stores news information with associated attachment file name. The filename will be in format "*yyyymmdd*_news_hdr.csv". The key is the "NewsItemId". Detail of the file structure is listed below:

Field Name	Example	Description	Corresponding element in NewsML message
News Datetime	141603	News release datetime	
NewsItemId	3280470	News ID	<NewsItemId>
FileName	0812\GLN201908129974_C.XLS	Full path and File name of the attachment. Table of content of multiple file if "Is Multiple File" = 1	
Language	zh-hk	Language of a news Remark: News headline and attachments are in Unicode	FormalName value in <Language>
Market Code	GEM	Market Code	FormalName value for Scheme "Mkt Code" in <SubjectMatter>
Expiry Date	20190812	Expiry Date of news	FormalName value for Scheme "Expiry Date" in <SubjectMatter>
Cancel Date		Present: This news is a cancel news Blank: Normal news	Type = "CANCELLED" in <UPDATEHEADLINE>
Amend Date		Present: This news is a amend news if the "Cancel Date" is blank	Type = "AMENDED" in <UPDATEHEADLINE>

Is Multiple File	0	0: News not contain multiple file 1: News contain multiple file	
Multiple File Path		Full path to store multiple files. Blank if "Is Multiple File" = 0	
Multiple File Name		Corresponding multiple file name in the directory stored in "Multiple File Path", separated by ";". Blank if "Is Multiple File" = 0	
Headline Category-T1	10000	Headline Category Tier 1 Code	FormalName value for Scheme "Headline Category-T1" in <SubjectMatter>
Headline	10000,<08008><08001><08009>-10000[14700,11300,18300](CM-A50053415)	News Title	<HeadLines> without Base64 encoding

- CSV file for News Stock Table (example file name: 20190812_news_stock_info.csv)

  It stores the related stock codes and related stock names associated with the news. For news with multiple stock codes/names, there will be multiple rows in the CSV file with same "NewsItemId". The filename will be in format "*yyyymmdd*_news_stock_info.csv". The key is the "NewsItemId". Detail of the CSV file structure is listed below:

Field Name	**Example**	**Description**	**Corresponding element in NewsML message**
NewsItemId	3280507	News ID	<NewsItemId>
Stock Code	3358	Stock Code	FormalName value for Scheme "Stock Code" in <SubjectMatter>
Stock Name	BESTWAY GLOBAL	Stock Name	FormalName value for Scheme "Stock Name" in <SubjectMatter> without Base64 encoding

- CSV file for News Tier 2 Table (example file name: 20190812_news_tier2.csv)

  It stores the Tier 2 codes associated with the news. For news with multiple Tier 2 code, there will be multiple rows in the CSV file with same "NewsItemId". The filename will be in format "*yyyymmdd*_news_tier2.csv". The key is the "NewsItemId". Detail of the CSV file structure is listed below:

Field Name	**Example**	**Description**	**Corresponding element in NewsML message**
NewsItemId	3280446	News ID	<NewsItemId>
Headline Category-T2	11100	Headline Category Tier 2 Code	FormalName value for Scheme "Headline Category-T2" in <SubjectMatter>

By using the news information stored in the three CSV files to find out the news headline information, including the News ID, News Release Datetime, News Attachment File Location and File Names, News Language, Market Code, News Expiry Date, Related Stock Code & Stock Names, Headline Category Tier-2 Code, Headline Category Tier-1 code, News Title, etc, as listed in the above 3 tables, information vendor can locate the corresponding attachment files from the file folder containing all news attachment files. The key "NewsItemId" is used to link up all related records in the three CSV files.

If the field "Is Multiple File" in the CSV file for News Header Table is equal to 1, it indicates that the news contains multiple attachment files. Information Vendor should use the field "Multiple File Path" and "Multiple File Name" in the same CSV file to retrieve the multiple attachment files stored in the specified path "Multiple File Path". The multiple file names are stored in field "Multiple File Name" with separator ";".

Handling of the news

Normal News
There will be 1 record in the "News Header Table" with same news title. Vendors expected to use the "NewsItemId" to find the related Tier2 code and stock code in the "News Stock Table" and "News Tier 2 Table"

Normal News without stock code (Dummy Stock Code)
There will be 1 record in the "News Header Table" with same news title. Information Vendor expected to use the "NewsItemId" to find the related Tier2 code and stock code in the "News Stock Table" and "News Tier 2 Table". Stock code "99999" is used to indicate it is a dummy stock code.

Cancel News
There will be 1 record in the "News Header Table" with same news title and news cancel date time in field "Cancel Date". Information Vendor can ignore this cancel news.

Cancel a hold up original news
There will be 1 record in the "News Header Table" with same news title and news cancel date time in field "Cancel Date". Information Vendor can ignore this cancel news.

News Amendment

1. Amendment of previous news released on the same date

   There will be two records in the News Header Table - Cancelled News and Amended News with same news title.

   Cancelled News: News with "Cancel Date" filled with news cancelled date/time and "Amend Date" filled with amended date/time. As this news is cancelled, Information Vendor can ignore this cancel news.

   Amended News: News with "Amend Date" filled with amended date/time. Information Vendor should to use the "NewsItemId" key to find the related Tier2 codes and stock codes in the CSV for "News Stock Table" and "News Tier 2 Table"

2. Amendment of previous news released on previous date (Original news released at least 1 day before the amended news)

   There will be one record in the News Header Table - Amended News

Amended News: News with “Amend Date” filled with amended date/time. Information Vendor should to use the “NewsItemId” key to find the related Tier2 codes and stock codes in the CSV for “News Stock Table” and “News Tier 2 Table”