



ISSUER INFORMATION *feed* SERVICE
(NEWS HEADLINE)
("IIS News Headline")

Transmission Specification

Version no.: 2.14

Date: 4 Jul 2022

Modification History

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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. HKEX-IS offers two datafeed products under the IIS system, namely, IIS which covers both news headings and contents; and IIS (News Headline) which provides only the news headings. This document provides message definition and application protocol between IIS and IIS subscribers /distributors/ information vendors (hereunder collectively abbreviated as “Vendor”) who subscribe for IIS (News Headline). 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 IIS (News Headline). 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.

Readers please note that the term “IIS” in the later text in this document refers to the IIS system which delivers the IIS (News Headline) service.

1.2 Document Structure

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

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 (News Headline) provides headings of real time news to Information Vendors and this covers the following categories.

1. Exchange news
2. Listed Company news
 - Main
 - GEM

All the news collected for distribution in IIS (News Headline) is 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 (News Headline) would provide one day online news headings to Vendors. After IIS System is restarted in the morning, only current day's news 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 (News Headline) would provide one day online news headings to Vendors. After IIS System is restarted in the morning, only current day's news 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

Once the Vendor has logon to IIS, updated and subscribed headline is delivered to the Vendor automatically. Each headline contains unique headline identity, news information, e.g. category, date/time in ISO 8601 format, language in ISO language code (ISO639-ISO3166).

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

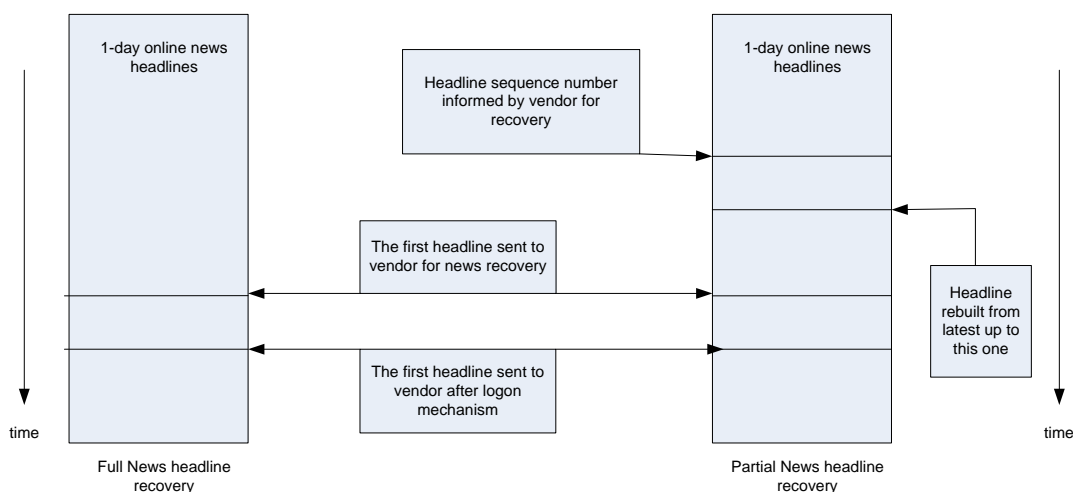
INITREQ and then LOGONREQ commands again. If the Vendor system is closed without sending LOGOFF command, IIS will discover the disconnection based on the message handshake protocol or TCP/IP layer whichever comes first.

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. 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.

2.4.3 Error Recovery

The Vendor can initiate a recovery request to recover up to 1 day's online news headlines from IIS. Two levels of recovery are provided for the Vendor. Firstly, a recovery of 1 day's online headline request can be made. 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 (News Headline) Certification Test according to the requirements as set out in the IIS (News Headline) Certification Test Procedures (This document will be provided by Exchange upon IIS (News Headline) service application) before they will be granted the IIS (News Headline) license. The IIS (News Headline) Certification Test will cover all requirements set out in this document. Apart from the IIS (News Headline) Certification Test, direct connection IIS (News Headline) vendors must meet all the requirements as set out in this IIS (News Headline) 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 are required to have their own monitoring on their system and connectivity, and able to alert when they cannot operate normally during IIS the operating window.
6. 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.
7. 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.
8. 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 (For current MDS subscribers, 128Kbps should be allocated for IIS headline and command messages) |
| 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

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 single live connection (with one live feed), IIS will provide two production Connection Ports and allow each Vendor to maintain only one logon session using one Vendor identity.

3.3 IIS Disaster Recovery Port in the Secondary Site

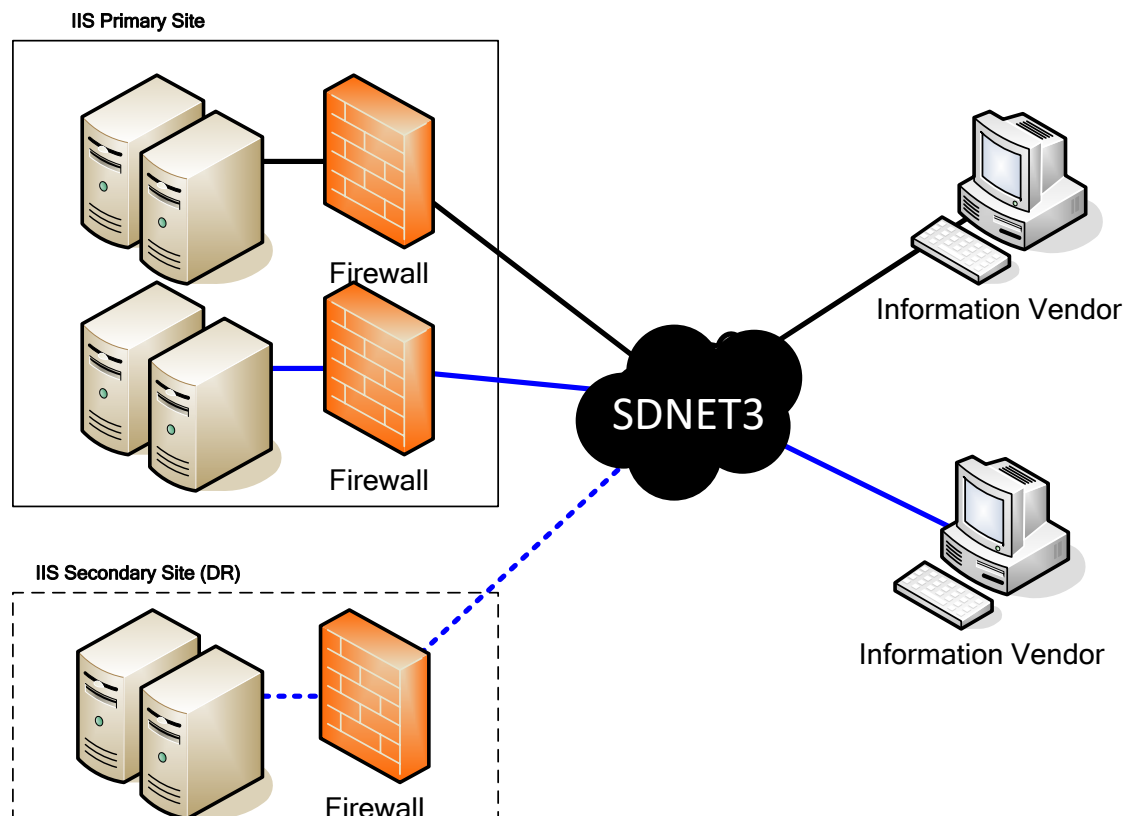
In order to increase the availability of IIS, a Secondary Site for IIS is introduced. Each Vendor will be provided with a single Disaster Recovery Port. A Disaster Recovery Port contains an IP address of IIS Data Delivery Server for headlines and command messages.

When site failover is triggered, Vendor will just need to switch their connection from the Primary Connection Port to the Disaster Recovery Port though there are dual live connections in the Primary Site.

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 Live-Live Connection 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 Vendors are required to have their own monitoring to detect their system and IIS connection failure so that any abnormalities can be promptly identified and remedied, e.g. unsuccessful login, disconnection, system fails to startup, etc.

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.

Under the situation when Information Vendor's system or connectivity encounters failure at their side and could not recover the news from IIS at their own, if Information Vendor needs the support from HKEX to recover the lost messages, they should on the same day send a request to HKEX. The news files would be provided to the Information Vendor to facilitate their data recovery. Please note, if the requested recovered news is long-dated, it may take a long time for data retrieval.

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 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:
 - o 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;
 - o 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).

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 headline delivery which is delivered in an unsolicited way. 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

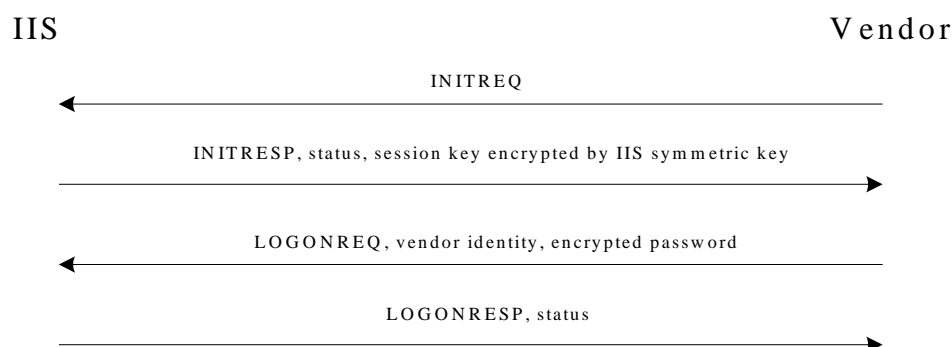
These messages are used for connection request and data recovery. The “MsgID” is among one of the following values.

| 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) Subscribed package (A or B or C) | Successful status indicating what kind of services is granted (headline) |
| 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 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. 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.

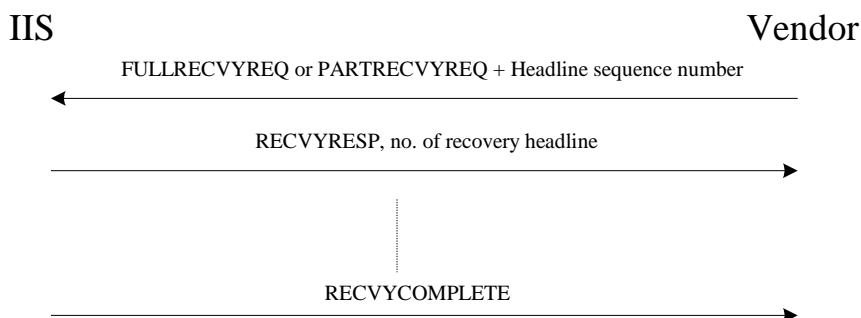
| Request command | Additional information | Description |
|-----------------|--------------------------|---|
| FULLRECVYREQ | | Request 1-day online headline recovery |
| PARTRECVYREQ | Headline sequence number | Request recovery headlines which come after the one specified by headline sequence number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

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. 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]/[CANCELLED]/[AMENDED]/[UPDATED]/[DELETED]. More detailed explanation is found in next section.

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.

5. Detailed Message Format

The message format for each message code in details is described in this section. The XML schema can be found in the Appendix A for reference.

For the news files that would be separately provided under the request from Information Vendors to recover their lost messages, the files contain the news headline messages which data message format is same as production, but the tag <UPDATEHEADLINE> is replaced by <RECVYHEADLINE>.

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 INTREQ

```
<?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 INTRESP

```
<?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 | CCYYMMDDT24HHM ISS[+-]]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 | | | | |
| New Password Parameters: | | | | | | | | |
| 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 CHNGWDRESP

```
<?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 | 0 | 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>
```

</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="FIRSTTAKE" SeqNo="999999999">
    <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>
        </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 |
|-----------|---|
| FIRSTTAKE | Indicating that this is the first time IIS has received this headline and it contains headline content and news information |
| CANCELLED | Indicating that the headline identified by <NewsIdentifier> is cancelled in the news source. The news is cancelled by the issuer. |
| AMENDED | Indicating that the headline identified by <NewsIdentifier> is an amended news in the news source. The news is amended by the issuer. |
| UPDATED | Indicating that the headline identified by <NewsIdentifier> is updated in the news source. The news is updated by HKEX. |
| DELETED | Indicating that the headline identified by <NewsIdentifier> is deleted in the news source. The news is deleted by HKEX and will be removed from HKEXnews website. |

For both CANCELLED and DELETED subtype, the vendor will receive a CANCELLED message and DELETED message with the same news identity of the original version of the news respectively. CANCELLED and DELETED message will be sent during recovery.

For DELETED subtype, the DELETED news will also be removed from HKEXnews website and cannot be further AMENDED or UPDATED.

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 | CANCELLED | News ID=1000 Headline Category-T1=10000 Headline Category-T2=20000 Headline Category-T2=20001 |
| 3 | AMENDED | News ID=2000 Headline Category-T1=40000 Headline Category-T2=50000 |

| | | |
|--|--|----------------------------|
| | | Headline Category-T2=50001 |
|--|--|----------------------------|

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 | 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 |
| 3 | AMENDED | News ID=2000 Headline Category-T1=40000 Headline Category-T2=50000 Headline Category-T2=50001 |
| 5 | CANCELLED Release to Vendor at specific time and later than the above mentioned AMENDED | 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 |
| 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 |
| 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 |
|--|--|--|

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

For UPDATED subtype, the Vendor will receive an UPDATED message with the same news identity of the original version of the news. In UPDATED subtype, the expiry date and/or the stock information of the news is changed. When IIS has just switched from Primary Site to Disaster Recovery Site, or vice versa, the original version of the UPDATED news is not provided.

UPDATED (scenario 1) subtype news (for immediate released news)

| Order | Message Type | Message Property |
|-------|--------------|---|
| 1 | FIRSTTAKE | News ID=9000000 Expiry Date=20220601 Stock Code=90000 Stock Name=Stock A |
| 3 | UPDATED | News ID=9000000 Expiry Date=20220602 Stock Code=90000 Stock Name=Stock A Stock Code=90001 Stock Name=Stock B |

UPDATED (scenario 1) subtype news (for hold up original news and cancelled news before release during recovery)

| Order | Message Type | Message Property |
|-------|--------------|---|
| 1 | UPDATED | News ID=9000000 Expiry Date=20220602 Stock Code=90000 Stock Name=Stock A Stock Code=90001 Stock Name=Stock B |

UPDATED (scenario 2) subtype news (for immediate released news)

| Order | Message Type | Message Property |
|-------|--------------|---|
| 1 | FIRSTTAKE | News ID=9000001 Expiry Date=20220601 Stock Code=90000 Stock Name=Stock A |
| 3. | CANCELLED | News ID=9000001 Expiry Date=20220601 Stock Code=90000 Stock Name=Stock A |
| 3 | UPDATED | News ID=9000001 Expiry Date=20220602 Stock Code=90000 Stock Name=Stock A Stock Code=90001 Stock Name=Stock B |

UPDATED (scenario 2) subtype news (for hold up original news and cancelled news before release during recovery)

| Order | Message Type | Message Property |
|-------|--------------|---|
| 1 | UPDATED | News ID=9000002 Expiry Date=20220602 Stock Code=90000 |

| | | |
|--|--|--|
| | | Stock Name=Stock A Stock Code=90001 Stock Name=Stock B |
|--|--|--|

For illustration, the following examples depict how DELETED message will work under normal and recovery processes.

DELETED subtype news (for immediate released news)

| Order | Message Type | Message Property |
|-------|--------------|------------------|
| 1 | FIRSTTAKE | News ID=9000003 |
| 3. | DELETED | News ID=9000003 |

DELETED subtype news (for hold up original news and cancelled news before release during recovery)

| Order | Message Type | Message Property |
|-------|--------------|------------------|
| 1. | DELETED | News ID=9000003 |

Note:

In addition to CANCELLED, AMENDED, UPDATED and DELETED message for current day news, it is possible for Vendor to receive any CANCELLED, AMENDED, UPDATED and DELETED 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.

A headline sequence number is assigned to each headline sent from. 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/ CANCELLED/ AMENDED/ UPDATED/ DELETED/ 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 | | | | |
| NewsIdentifier | 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 | | | | |
| | | | | | | | | |
| DescriptiveMeta data | complex | O | 1 | New Item Descriptive data | | | | |
| Language | complex | O | 1 | Language of news headline News headline is 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 | | | | |

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>
</NDSML>
```

```
</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:

| Item | Requirement | | | | | | | | | | | | | | | | | | | | |
|--------------------------|--|-----------|------|---|-------------|---|---------|---|--------------------|----|-------------|---|-------|---|-----------|---|----------|---|------------------|---|-------------------|
| Length of password | At least 16 characters Maximum 20 characters | | | | | | | | | | | | | | | | | | | | |
| Complexity of password | <p>Must contain a combination of:</p> <ul style="list-style-type: none"> - Upper case letter - Lower case letter - Number - <u>Special character as listed below:</u> <table border="1"> <thead> <tr> <th>Character</th> <th>Name</th> </tr> </thead> <tbody> <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> </tbody> </table> | Character | Name | ! | Exclamation | @ | At sign | # | Number sign (hash) | \$ | Dollar sign | ^ | Caret | & | Ampersand | * | Asterisk | (| Left parenthesis |) | Right parenthesis |
| Character | Name | | | | | | | | | | | | | | | | | | | | |
| ! | Exclamation | | | | | | | | | | | | | | | | | | | | |
| @ | At sign | | | | | | | | | | | | | | | | | | | | |
| # | Number sign (hash) | | | | | | | | | | | | | | | | | | | | |
| \$ | Dollar sign | | | | | | | | | | | | | | | | | | | | |
| ^ | Caret | | | | | | | | | | | | | | | | | | | | |
| & | Ampersand | | | | | | | | | | | | | | | | | | | | |
| * | Asterisk | | | | | | | | | | | | | | | | | | | | |
| (| Left parenthesis | | | | | | | | | | | | | | | | | | | | |
|) | Right parenthesis | | | | | | | | | | | | | | | | | | | | |
| Enforce password history | Not the same as any of the last 5 passwords | | | | | | | | | | | | | | | | | | | | |

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/3) 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[0-2][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:restriction>
  </xsd:simpleType>
  <xsd:simpleType name="long">
    <xsd:restriction base="xsd:integer">
      <xsd:minInclusive value="0"/>
      <xsd:maxInclusive value="999999999"/>
    </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]"/>
    </xsd:restriction>
  </xsd:simpleType>
  <xsd:simpleType name="id">
    <xsd:restriction base="xsd:string">
      <xsd:pattern value="[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[0-2][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:schema>
```

```

        </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
=====

```

        </xsd:documentation>
    </xsd:annotation>
    <xsd:complexType>
        <xsd:sequence>
            <xsd:element name="ErrCode" type="errcode"/>
            <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="dateTime"/>
            <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="dateTime"/>
            <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="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="LOGONREQ">
    <xsd:annotation>
        <xsd:documentation>

```

===== LOGONREQ =====

Vendor Logon command message

```

        </xsd:documentation>
    </xsd:annotation>
    <xsd:complexType>
        <xsd:sequence>
            <xsd:element name="Username" type="string"/>
            <xsd:element name="Password">
                <xsd:complexType>
                    <xsd:sequence>
                        <xsd:element name="Encoding">
                            <xsd:complexType>
                                <xsd:group ref="SingleEncodedData"/>
                                <xsd:attribute name="Notation" type="string" use="required"/>
                            </xsd:complexType>
                        </xsd:element>
                    </xsd:sequence>
                </xsd:complexType>
            </xsd:element>
            <xsd:attribute name="ReqId" type="string" use="required"/>
        </xsd:sequence>
    </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="string" minOccurs="0"/>
            <xsd:element name="PackageType" type="string" minOccurs="0"/>
            <xsd:element name="LastLoginTime" type="dateTime" minOccurs="0"/>
        </xsd:sequence>
    </xsd:complexType>

```

```

        </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="CANCELLED"/>
        <xsd:enumeration value="AMENDED"/>
        <xsd:enumeration value="UPDATED"/>
        <xsd:enumeration value="DELETED"/>
      </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="CANCELLED"/>
        <xsd:enumeration value="AMENDED"/>
        <xsd:enumeration value="UPDATED"/>
        <xsd:enumeration value="DELETED"/>
      </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 =====
          </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:sequence>
  </xsd:complexType>
</xsd:element>

```

```
</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.

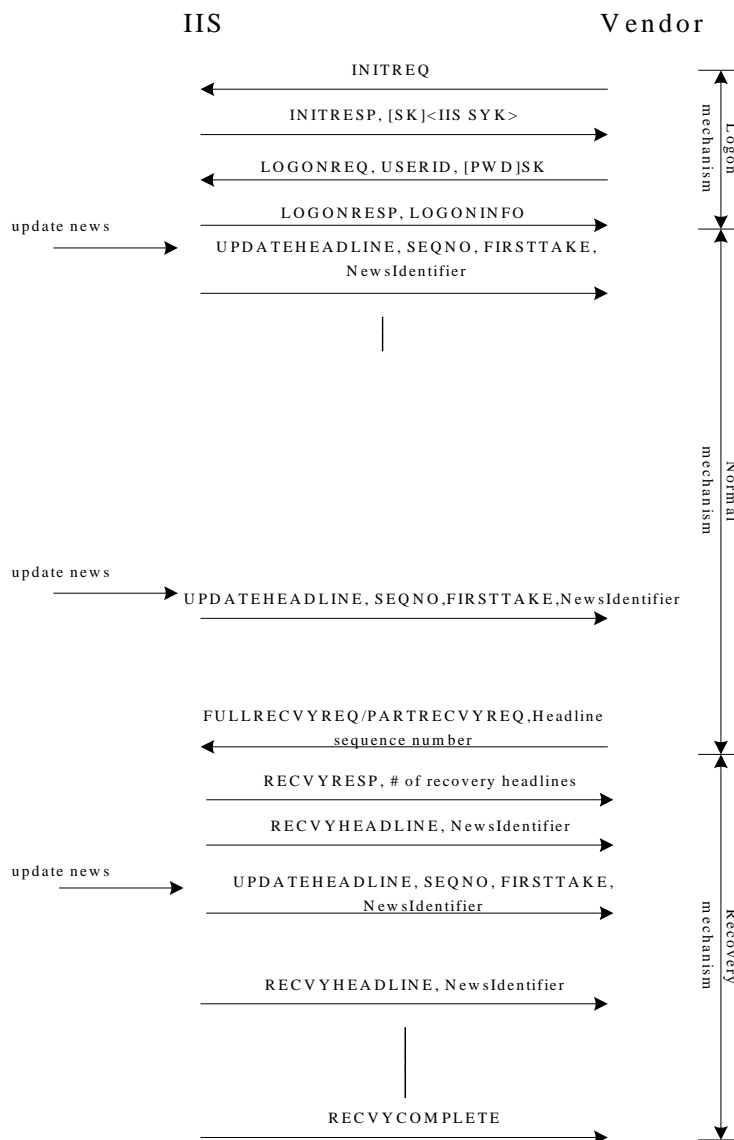
The procedure to obtain plain text session key in INITREQ message is as follows.

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

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 |
| INCORRECT_VENDOR | 90010 | Incorrect Vendor identity or password |
| 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 DescriptiveMetadata

There are different kinds of subject code comes within DescriptiveMetadata which is identified by the scheme name. Scheme can be headlinecategory, 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: <ul style="list-style-type: none"> ▪ 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: <ul style="list-style-type: none"> ▪ 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 ¹ | Change in Qualified Accountant (Before 1 January 2009) | 更換合資格會計師 (2009年1月1日前) |
| 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 ¹ | Non-compliance with Qualified Accountant Requirements (Before 1 January 2009) | 未能符合合資格會計師的規定 (2009年1月1日前) |
| 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 |

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| 10000 | 13251 | Dividend or Distribution (Announcement Form) | 股息或分派（公告表格） |
| 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 ¹ | Results of Voting by Poll (Before 1 January 2009) | 投票表決的結果 (2009 年 1 月 1 日前) |
| 10000 | 15000 | Change in Auditors subject to Shareholders' Approval | 在股東批准的情況下更換核數師 |

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| - | - | 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 | 混合媒介要約 |
| - | - | 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 | Discloseable 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 |
| 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 |

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| 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 ¹ | Fundamental Change in Principal Business Activities (Before 1 January 2009) | 主要業務活動出現根本轉變 (2009年1月1日前) |
| 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 | 18110 | Bonus Issue (Announcement Form) | 紅股或紅利 (公告表格) |
| 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 |

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| 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 |

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| 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 ² | Price-Sensitive Information (before 1 January 2013) | 股價敏感資料(2013年1月1日前) |
| 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 |

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| 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 ¹ | Discloseable Transaction (Before 1 January 2009) | 須予披露的交易 (2009年1月1日前) |
| 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》所指的發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 |

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| - | - | 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 | 主要附屬公司發行證券 |
| 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 |

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| 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 |
| 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 | 71500 | Daily Trading Report - CBBC | 每日交易報告 – 牛熊證 |
| 70000 | 71600 | Pre-Listing Trading Report - CBBC | 上市前交易報告 – 牛熊證 |
| 70000 | 72500 | Additional information - Exotic CBBC | 附加資料 – 非標準型牛熊證 |
| 70000 | 72550 | Expiry Announcement - CBBC | 到期公告 – 牛熊證 |
| 70000 | 72600 | Launch Announcement - CBBC | 發行公告 – 牛熊證 |
| 70000 | 72650 | Other - CBBC | 其他 – 牛熊證 |
| 70000 | 72660 | Adjustment to Terms and Conditions - CBBC | 調整條款及細則 – 牛熊證 |
| 70000 | 72661 | Adjustment to Terms and Conditions (Announcement Form) - CBBC | 調整條款及細則 (公告表格) – 牛熊證 |

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| 70000 | 72670 | Inside Information - CBBC | 內幕消息 – 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 | 72700 | Resumption - CBBC | 復牌 – 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 |
| 70000 | 72731 | Withdrawal of Listing (Announcement Form) - CBBC | 撤銷上市 (公告表格) – 牛熊證 |
| 70000 | 73500 | Base Listing Document - CBBC | 基礎上市文件 – 牛熊證 |
| 70000 | 73600 | Supplemental Listing Document - CBBC | 補充上市文件 – 牛熊證 |
| 70000 | 73700 | Residual Value (Announcement Form) - CBBC | 剩餘價值 (公告表格) – 牛熊證 |
| - | - | Derivative Warrants (DW) | 衍生權證 |
| 70000 | 71100 | Daily Trading Report - DW | 每日交易報告 – 衍生權證 |
| 70000 | 71200 | Pre-Listing Trading Report - DW | 上市前交易報告 – 衍生權證 |
| 70000 | 72100 | Additional information - Exotic DW | 附加資料 – 非標準型衍生權證 |
| 70000 | 72150 | Expiry Announcement - DW | 到期公告 – 衍生權證 |
| 70000 | 72200 | Launch Announcement - DW | 發行公告 – 衍生權證 |
| 70000 | 72250 | Other - DW | 其他 – 衍生權證 |
| 70000 | 72740 | Adjustment to Terms and Conditions - DW | 調整條款及細則 – 衍生權證 |
| 70000 | 72741 | Adjustment to Terms and Conditions (Announcement Form) - DW | 調整條款及細則 (公告表格) – 衍生權證 |
| 70000 | 72750 | Inside Information - DW | 內幕消息 – 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 | 72780 | Resumption - DW | 復牌 – 衍生權證 |

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| 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 |
| 70000 | 72811 | Withdrawal of Listing (Announcement Form) - DW | 撤銷上市（公告表格） – 衍生權證 |
| 70000 | 73100 | Base Listing Document - DW | 基礎上市文件 – 衍生權證 |
| 70000 | 73200 | Supplemental Listing Document - DW | 補充上市文件 – 衍生權證 |
| - | - | Equity Linked Instruments (ELI) | 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 | 71400 | Pre-Listing Trading Report - ELI | 上市前交易報告 – 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 | 72350 | Expiry Announcement - ELI | 到期公告 – 股票掛鈎票據 |
| 70000 | 72400 | Launch Announcement - ELI | 發行公告 – 股票掛鈎票據 |
| 70000 | 72450 | Other - ELI | 其他 – 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 | 72830 | Inside Information - ELI | 內幕消息 – 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 | 72860 | Resumption - ELI | 復牌 – 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 |
| 70000 | 73300 | Base Listing Document - ELI | 基礎上市文件 – 股票掛鈎票據 |
| 70000 | 73400 | Supplemental Listing Document - ELI | 補充上市文件 – 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 |

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|-------|-------|---|--------------------|
| 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 | 72970 | Inside Information - Debt Securities | 內幕消息 – 債務證券 |
| 70000 | 72980 | Redemption or 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 |
| 70000 | 73030 | Interest Payment (Announcement Form) - Debt Securities | 利息派發（公告表格） – 債務證券 |
| 70000 | 74100 | Formal Notice - Debt Securities | 上市通告 – 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 | 75100 | Offering Circular and Pricing Supplement - Debt Securities | 發行通函或定價補充文件 – 債務證券 |
| 70000 | 75200 | Prospectus - Debt Securities | 招股章程 – 債務證券 |
| 70000 | 75300 | Issuer-Specific Report - Debt Securities | 發行人特定報告 – 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 |

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| 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, OC Announcements and Post Hearing Information Packs or PHIPs | 申請版本、整體協調人公告及聆訊後資料集 |
| 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 |
| 91000 | 91300 | OC Announcements or related materials | 整體協調人公告或相關材料 |
| 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 ¹ | - | Share Buyback Reports (Before 1 January 2009) | 股份購回報告 (2009年1月1日前) |
| 51500 | - | Monthly Returns | 月報表 |
| 53000 | - | Company Information Sheet | 公司資料報表 |
| 54000 | - | Constitutional Documents | 憲章文件 |
| 55000 | - | Takeovers Code - dealing disclosures | 合併守則 - 交易披露 |
| 56000 ³ | - | Headline Category – Documents on Display | 標題類別– 展示文件 |
| 57000 ³ | - | Headline Category – Documents on Display (Debt Issuance Programmes) | 標題類別– 展示文件 (債務證券發行計劃) |
| 58000 ³ | - | Headline Category – Documents on Display (Debt Securities) | 標題類別– 展示文件 (債務證券) |

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|--------------------|------|--|-------------------|
| 59000 ³ | - | Headline Category – Documents on Display (Structured Products) | 標題類別– 展示文件（結構性產品） |
| MISC | MISC | Miscellaneous | 雜項 |

¹ **Headline ceased to be used since 1 January 2009**

² **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.

³ **IIS does not transmit Documents on Display, which is the same arrangement as these were in physical form.**

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>
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