



**RESILIENCE ENHANCEMENT
ON ORION MARKET DATA
PLATFORM FOR SECURITIES
MARKET (OMD-C)**



HKEX-IS
May 2020

AGENDA

1

Purpose and Major Enhancements

2

High Level Changes of the Enhancement

- Enhancement in Real-time Data
- Enhancement in Retransmission Service (RTS)
- Other Enhancement – OMD Index

3

Implementation Timeline



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Purpose of the Resilience Enhancement on OMD-C

Strengthen the technical resilience in OMD-C by including nodes in the secondary site as stand-by nodes for automatic failover, to foster OMD-C service availability in case a servicing node in the primary site fails.



Major Enhancements

- 1** Real-time data: enable **automatic failover** to hot-standby node in secondary site in case service node in primary site cannot function properly
- 2** Retransmission Service (RTS): change from active-standby to **active-active** between primary and secondary site setup; meaning increasing to four active nodes in service^[1]
- 3** OMD Index: in case of interruption of service, a file of missing ticks of OMD index data will be provided at day-end^[2]



[1] Clients should only connect to one RTS node

[2] This refers to scenario that the incident is not due to the index compiler

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Implementation Timeline



Enhancement in Securities Standard (SS) – 1 of 2

OMD-C Securities Standard (SS)

Contents:

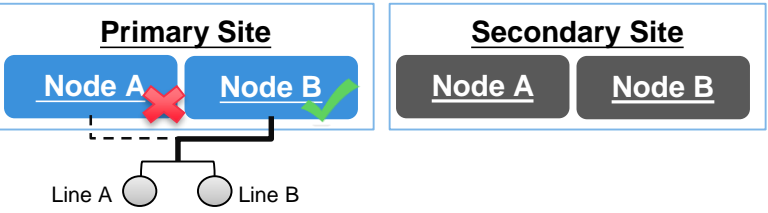
- Reference Data	- Order Book Data	- Index Data ¹
- Trading Session Status	- Trade And Price Data	- Stock Connect Data ²
- Security Status	- Market Turnover	
- Statistics	- Yield	

Current Resilience Model

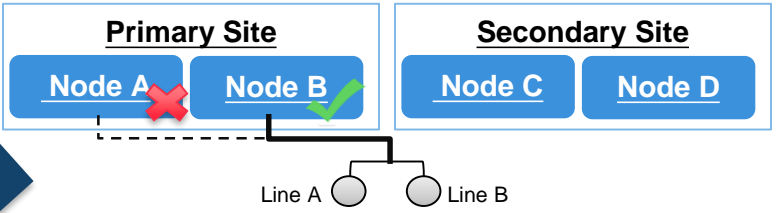
Enhanced Resilience Model

Advancement:

Scenario 1: Hardware failure happens at an active node



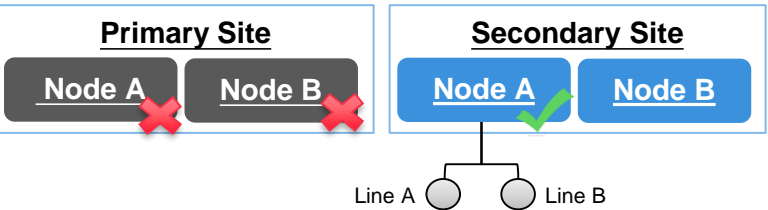
- Automatically take up by the Hot-standby node
- A **short interruption** on the affected channels when switching to the standby node



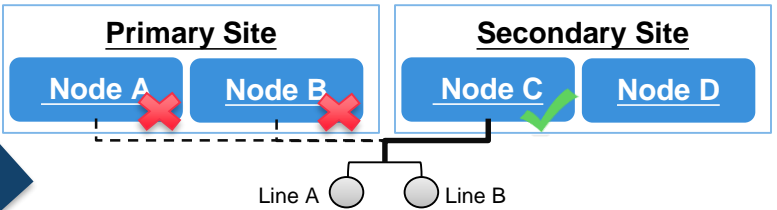
N/A

Same arrangement

Scenario 2: Hardware failure happens at remaining node (node B) in the Primary site



- Clients would be alerted for OMD Site Failover
- At least 30 minutes interruption for ready to connect to Secondary site



- Node C **automatically** provide service, clients would only experience a short interruption

- ✓ Stronger resilience support as nodes in Secondary Site could disseminate data instantly
- ✓ Reduce the interruption time as OMD Site Failover procedure is not triggered³



1 – For Subscribers of Complimentary Datafeed – IDX
 2 – For Subscribers of Complimentary Datafeed – SCM
 3 – Site Failover will only be triggered when there is a site issue

Enhancement in Securities Standard (SS) – 2 of 2

OMD-C Securities Standard (SS)

Contents:

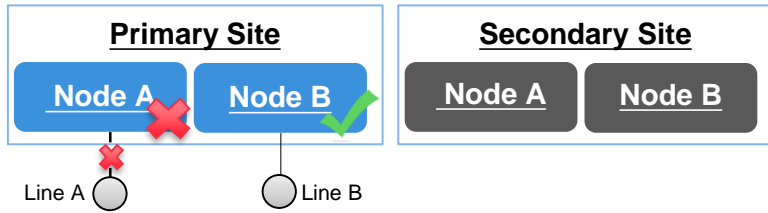
- News
- Odd Lot Order Book Data¹

Current Resilience Model

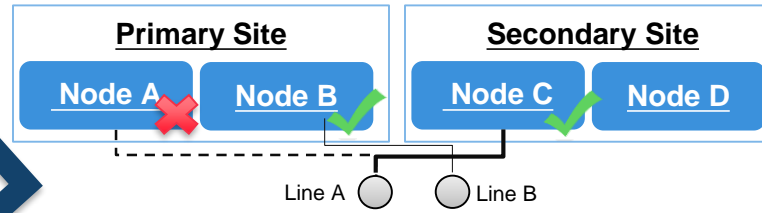
Enhanced Resilience Model

Advancement:

Scenario 1: Hardware failure happens at one of the active nodes



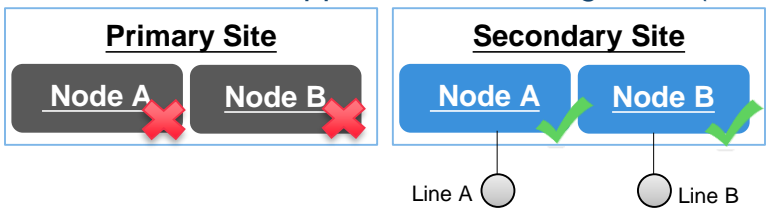
- Data provisioning will be on **single line only**



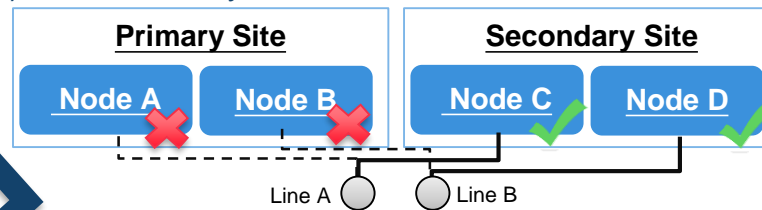
- The failure node will be taken up by a standby node in the secondary site after a slight interruption
- Messages received from secondary site is expected to be later than the messages from primary site²

- Remain dual lines data provisioning

Scenario 2: Hardware failure happens at remaining node (node B) in the Primary site



- Clients would be alerted for OMD Site Failover
- At least 30 minutes interruption for ready to connect to Secondary site



- Nodes in secondary site **automatically** pick up the servicing

- At any point in time, data is disseminated through either line A or line B, or both. No data dissemination interruption as a whole.



1 – For Subscribers of Complimentary Datafeed – OLO

2 – Around 1 – 2 milliseconds difference is expected

Enhancement in Securities Premium (SP) & Securities FullTick (SF) – 1 of 2

OMD-C Securities Premium (SP) and Securities FullTick (SF)

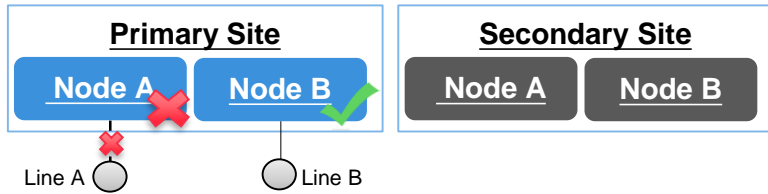
Contents:

- Security Status
- Order Book Data
- Trade and Price Data

- Odd Lot Order Book Data¹
- Statistics (SP only)
- News (SP only)
- Yield (SP only)

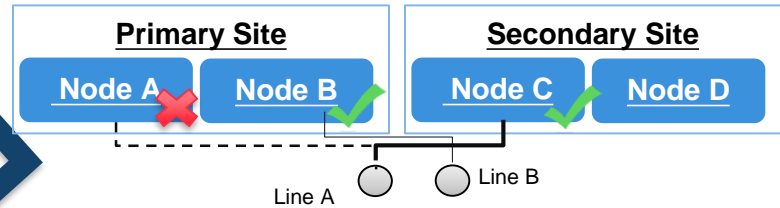
Current Resilience Model

Scenario 1: Hardware failure happens at one of the active nodes



- Data provisioning will be on **single line only**

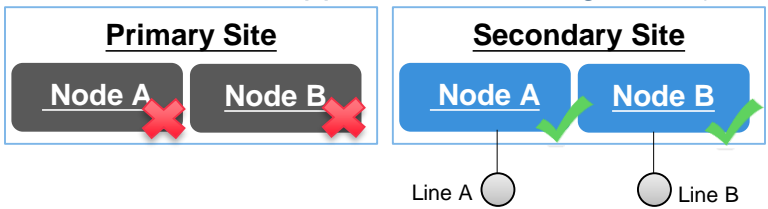
Enhanced Resilience Model



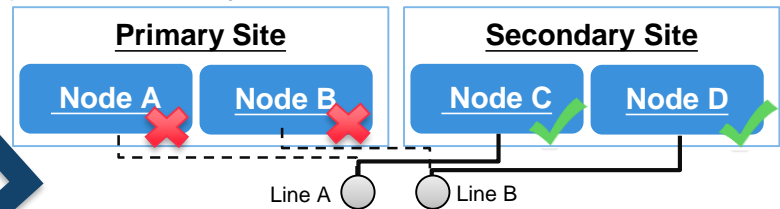
- The failure node will be taken up by a standby node in the secondary site after a slight interruption
- Messages received from secondary site is expected to be later than the messages from primary site²

- Remain dual lines data provisioning

Scenario 2: Hardware failure happens at remaining node (node B) in the Primary site



- Clients would be alerted for OMD Site Failover
- At least 30 minutes interruption for ready to connect to Secondary site



- Nodes in secondary site **automatically** pick up the servicing

- At any point in time, data is disseminated through either line A or line B, or both. No data dissemination interruption as a whole.



1 – For Subscribers of Complimentary Datafeed – OLO
 2 – Around 1 – 2 ms difference is expected
 3 – Site Failover will only be triggered at site issue

Enhancement in Securities Premium (SP) & Securities FullTick (SF) – 2 of 2

OMD-C Securities Premium (SP) and Securities FullTick (SF)

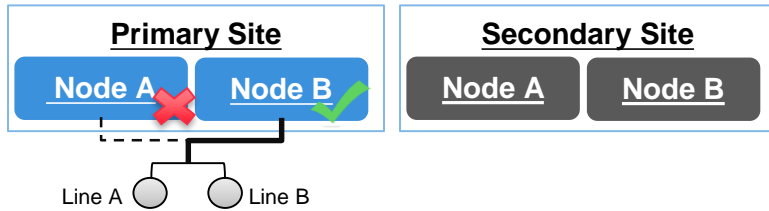
Contents:

- Reference Data
- Trading Session Status
- Market Turnover (SP only)

- Broker Queue¹
- Index Data²
- Stock Connect Data³

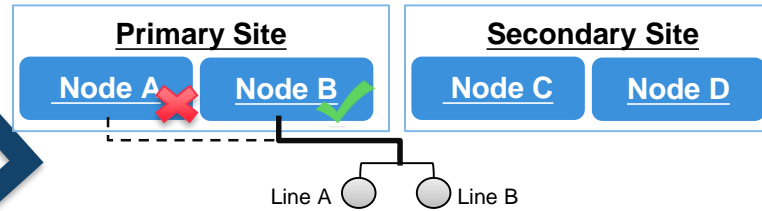
Current Resilience Model

Scenario 1: Hardware failure happens at the active node



- Automatically take up by the Hot-standby node
- A **short interruption** on the affected channels when switching to the standby node

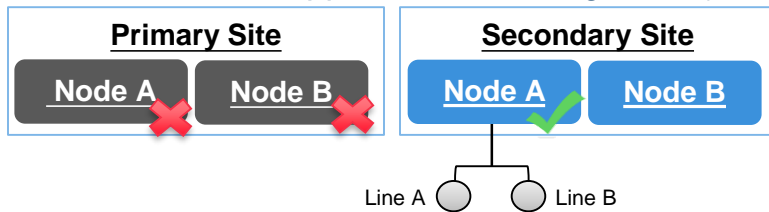
Enhanced Resilience Model



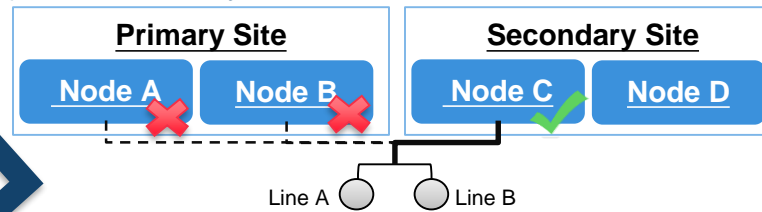
Same arrangement

Advancement:

Scenario 2: Hardware failure happens at remaining node (node B) in the Primary site



- Clients would be alerted for OMD Site Failover
- At least 30 minutes interruption for ready to connect to Secondary site



- Node C **automatically** provide service, clients would only experience a short interruption

- ✓ Stronger resilience support as nodes in Secondary Site could disseminate data instantly
- ✓ Reduce the interruption time as OMD Site Failover procedure is not triggered⁴



1 – For Subscribers of Complimentary Datafeed – CBQ
 2 – For Subscribers of Complimentary Datafeed – IDX
 3 – For Subscribers of Complimentary Datafeed – SCM
 4 – Site Failover will only be triggered at site issue

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High Level Changes of the Enhancement

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- **Enhancement in Retransmission Service (RTS)**
- Other Enhancement – OMD Index

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Implementation Timeline



Enhancement in Retransmission Service (RTS)

OMD-C Retransmission Service (RTS)

Current Resilience Model

- RTS is supporting by **two nodes** in an Active-Active setup either in primary or secondary site¹
- Retransmission Service (RTS) will be suspended if both RTS nodes fail (i.e. Double nodes failure); service will be resumed only if the RTS servers in the Secondary site are being activated

Enhanced Resilience Model

- RTS is supporting by **four nodes** all in Active mode across Primary and Secondary sites (i.e. two nodes respectively on each site)¹
- Retransmission Service (RTS) will NOT be impacted at a same-site double nodes failure scenario

Advancement:

- ☑ Clients can connect to any one of the four RTS nodes at any time
- ☑ No Service Impact in the same-site double nodes failure scenario
- ☑ Clients may develop a round-robin logon mechanism by hunting the rest of RTS servers in case of any failure on one RTS service node



¹ - Clients should only connect to one RTS node

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- Enhancement in Real-time Data
- Enhancement in Retransmission Service (RTS)
- **Other Enhancement – OMD Index**

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Implementation Timeline



Other Enhancement – OMD Index

- In case of missing ticks from OMD Index due to OMD failure (while the source feed from index compiler remains healthy), a file with the index missing ticks will be sent by email to registered correspondence and technical contacts
- The Index data file layout is stated in the interface specification



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High Level Changes of the Enhancement

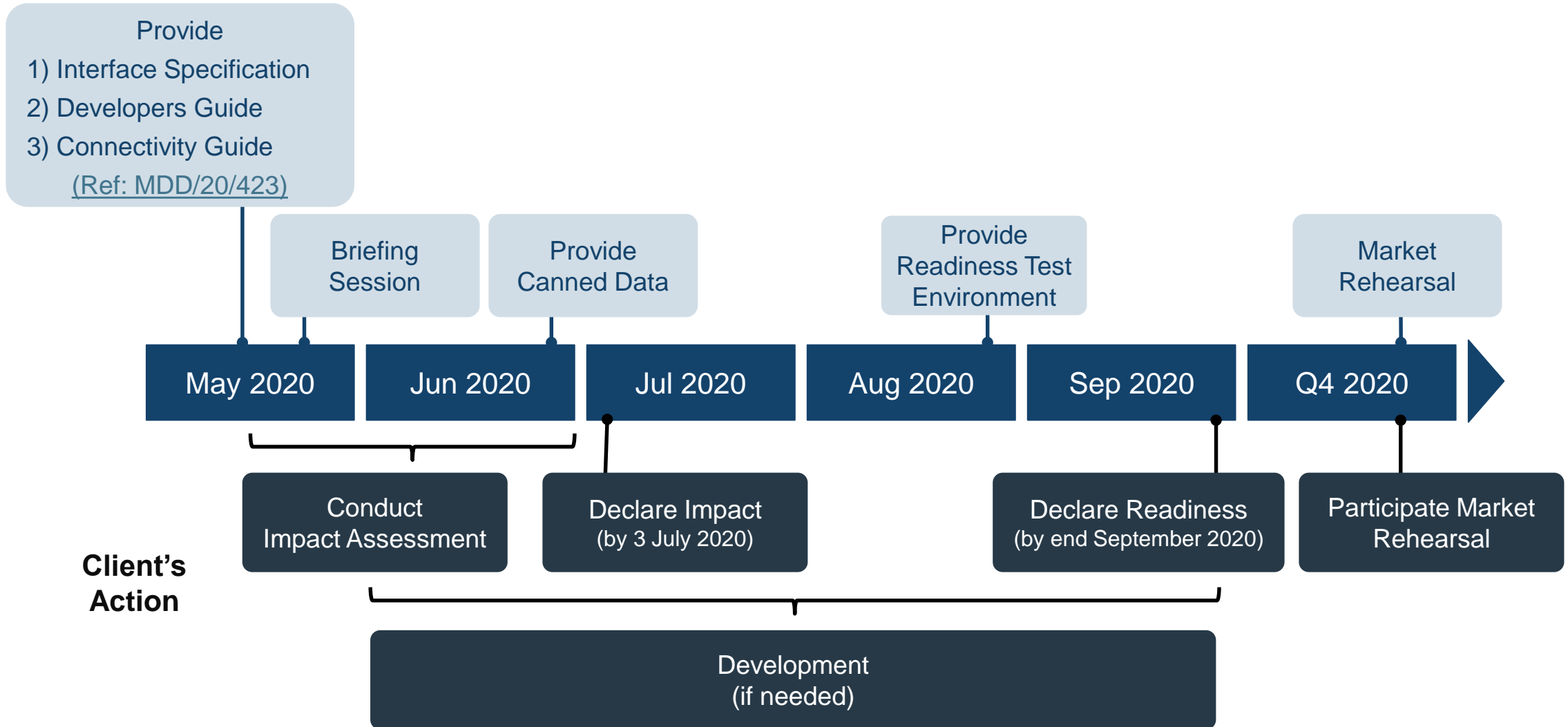
- Enhancement in Real-time Data
- Enhancement in Retransmission Service (RTS)
- Other Enhancement – OMD Index

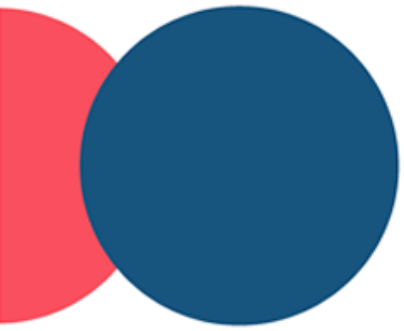
3

Implementation Timeline



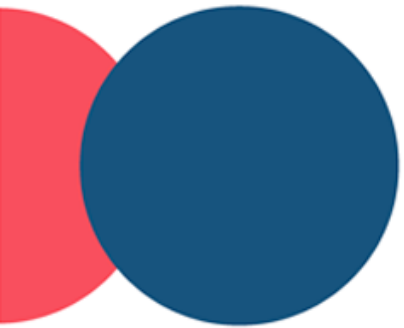
Implementation Timeline





OMD-C Corner: www.hkex.com.hk/OMDC

For enquires, please contact
Data Connectivity & Support Team
via IVSupport@hkex.com.hk.



APPENDIX

APPENDIX I – Messages Resend / Not Resend after interruption due to node failover in Securities Standard (SS)

Content	Message ID	Message Name	Messages resend after interruption period ¹
Reference Data	10	Market Definition	Yes
	11	Security Definition	Yes
	13	Liquidity Provider	Yes
	14	Currency Rate	Yes
Status Data	20	Trading Session Status	Yes
	21	Security Status	Yes
News	22	News	No



¹ – The handling on resend of messages after interruption period is the same as current resilience model. Messages would only be resent if updated during the interruption period

APPENDIX I – Messages Resend / Not Resend after interruption due to node failover in Securities Standard (SS)

Content	Message ID	Message Name	Messages resend after interruption period ¹
Value Added Data	44	Yield	Yes
	60	Statistics	Yes
	61	Market Turnover	No
Order Book Data	53	Aggregate Order Book Update	Yes
	54	Broker Queue	Yes
	56	Order Imbalance	Yes
Trade and Price Data	52	Trade Ticker	Yes
	62	Closing Price	Yes
	40	Nominal Price	Yes
	41	Indicative Equilibrium Price	Yes
	43	Reference Price	Yes
	23	VCM Trigger	Yes



¹ – The handling on resend of messages after interruption period is the same as current resilience model. Messages would only be resent if updated during the interruption period

APPENDIX I – Messages Resend / Not Resend after interruption due to node failover in Securities Standard (SS)

Content	Message ID	Message Name	Messages resend after interruption period ¹
Index Data ²	70	Index Definition	No
	71	Index Data	No ⁵
Odd Lot Order Book Data ³	33	Add Odd Lot Order	No
	34	Delete Odd Lot Order	No
Stock Connect Data ⁴	80	Stock Connect Daily Quota Balance	No
	81	Stock Connect Market Turnover	No



1 – The handling on resend of messages after interruption period is the same as current resilience model. Messages would only be resent if updated during the interruption period

2 – For Subscribers of Complimentary Datafeed – IDX

3 – For Subscribers of Complimentary Datafeed – OLO

4 – For Subscribers of Complimentary Datafeed – SCM

5 – Missing Index value during interruption period will be provided to Clients in file format by email

APPENDIX II – Messages Resend / Not Resend after interruption due to node failover in Securities Premium (SP)

Content	Message ID	Message Name	Messages resend after interruption period ¹
Reference Data	10	Market Definition	Yes
	11	Security Definition	Yes
	13	Liquidity Provider	Yes
	14	Currency Rate	Yes
Status Data	20	Trading Session Status	Yes
	21	Security Status	No
News	22	News	No



¹ – The handling on resend of messages after interruption period is the same as current resilience model. Messages would only be resent if updated during the interruption period

APPENDIX II – Messages Resend / Not Resend after interruption due to node failover in Securities Premium (SP)

Content	Message ID	Message Name	Messages resend after interruption period ¹
Value Added Data	44	Yield	No
	60	Statistics	No
	61	Market Turnover	No
Order Book Data	53	Aggregate Order Book Update	No
	56	Order Imbalance	No
Trade and Price Data	50	Trade	No
	51	Trade Cancel	No
	62	Closing Price	No
	40	Nominal Price	No
	41	Indicative Equilibrium Price	No
	43	Reference Price	No
	23	VCM Trigger	No



¹ – The handling on resend of messages after interruption period is the same as current resilience model. Messages would only be resent if updated during the interruption period

APPENDIX II – Messages Resend / Not Resend after interruption due to node failover in Securities Premium (SP)

Content	Message ID	Message Name	Messages resend after interruption period ¹
Index Data ²	70	Index Definition	No
	71	Index Data	No ⁶
Odd Lot Order Book Data ³	33	Add Odd Lot Order	No
	34	Delete Odd Lot Order	No
Broker Queue ⁴	54	Broker Queue	Yes
Stock Connect Data ⁵	80	Stock Connect Daily Quota Balance	No
	81	Stock Connect Market Turnover	No



1 – The handling on resend of messages after interruption period is the same as current resilience model. Messages would only be resent if updated during the interruption period

2 – For Subscribers of Complimentary Datafeed – IDX

3 – For Subscribers of Complimentary Datafeed – OLO

4 – For Subscribers of Complimentary Datafeed – CBQ

5 – For Subscribers of Complimentary Datafeed – SCM

6 – Missing Index value during interruption period will be provided to Clients in file format by email

APPENDIX III – Messages Resend / Not Resend after interruption due to node failover in Securities FullTick (SF)

Content	Message ID	Message Name	Messages resend after interruption period ¹
Reference Data	10	Market Definition	Yes
	11	Security Definition	Yes
	13	Liquidity Provider	Yes
	14	Currency Rate	Yes
Status Data	20	Trading Session Status	Yes
	21	Security Status	No



¹ – The handling on resend of messages after interruption period is the same as current resilience model. Messages would only be resent if updated during the interruption period

APPENDIX III – Messages Resend / Not Resend after interruption due to node failover in Securities FullTick (SF)

Content	Message ID	Message Name	Messages resend after interruption period ¹
Order Book Data	30	Add Order	No
	31	Modify Order	No
	32	Delete Order	No
	56	Order Imbalance	No
Trade and Price Data	50	Trade	No
	51	Trade Cancel	No
	41	Indicative Equilibrium Price	No
	43	Reference Price	No
	23	VCM Trigger	No



¹ – The handling on resend of messages after interruption period is the same as current resilience model. Messages would only be resent if updated during the interruption period

APPENDIX III – Messages Resend / Not Resend after interruption due to node failover in Securities FullTick (SF)

Content	Message ID	Message Name	Messages resend after interruption period ¹
Index Data ²	70	Index Definition	No
	71	Index Data	No ⁶
Odd Lot Order Book Data ³	33	Add Odd Lot Order	No
	34	Delete Odd Lot Order	No
Broker Queue ⁴	54	Broker Queue	Yes
Stock Connect Data ⁵	80	Stock Connect Daily Quota Balance	No
	81	Stock Connect Market Turnover	No



1 – The handling on resend of messages after interruption period is the same as current resilience model. Messages would only be resent if updated during the interruption period.

2 – For Subscribers of Complimentary Datafeed – IDX

3 – For Subscribers of Complimentary Datafeed – OLO

4 – For Subscribers of Complimentary Datafeed – CBQ

5 – For Subscribers of Complimentary Datafeed – SCM

6 – Missing Index value during interruption period will be provided to Clients in file format by email

APPENDIX IV – Dissemination of Disaster Recovery Signal (105) scenario

- Site failover of OMD-C will be triggered in the events of:
 - 1) HKEX Data Center Failure
 - 2) Site failover of Orion Trading Platform – Securities Market (OTP-C) is triggered
- Disaster Recovery Signal (105) message will be disseminated for above scenarios and the handling of this message remains unchanged

