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Market Lens

Recommended Best Practices to Enhance Exchange Recovery & Mitigate the Impact of Outages

Over the past two years, several major exchanges around the globe have experienced outages. While significant attention has appropriately been focused on prevention, there are important lessons to be learned regarding recovery. A review of the recent outages identifies several common issues which compounded the impact of the outages. While many of these were subsequently rectified at the exchanges that experienced outages, they continue to be largely overlooked by exchanges who have not suffered an outage. The following paper outlines best practices for all exchanges to follow, as well as additional measures for policymakers to consider in order to enhance the resiliency of the broader market ecosystem in responding to and recovering from exchange outages.

EXECUTIVE SUMMARY

Exchanges and their stakeholders have worked to substantially strengthen the resiliency and business continuity of markets and significantly decrease the likelihood of major exchange outages taking place. What has frequently received less attention, however, is how exchanges recover from outages that do occur, as highlighted in the responses of major exchanges in North America, Europe and the Asia-Pacific region over the past two years. A thorough review of common shortcomings in the exchanges' responses to these outages highlights areas where the adoption of best practices would significantly reduce the impact of exchange outages and enhance both exchange and overall market resiliency. It is worth re-iterating that these themes have by-and-large only been identified and rectified by those exchanges who have suffered recent outages, although they are equally relevant to all exchanges across the globe:

- **Communications** should be clear, succinct and frequent, with horizontal silos removed;
- **Order and Trade Cancellation** playbooks and policies should be clearly established and communicated with market participants prior to an event;
- **Market Re-open** policies need to be developed and communicated in advance and market re-openings should be communicated with adequate notification to participants; and
- **Governance Structures** should be regularly reviewed and input from internal and external stakeholders on items including exchange issues, strategic development, rules, and outage playbooks and scenario plans should be regularly and formally solicited.

Policymakers and regulators should also consider further market structure reforms that minimize single points of failure and lessen dependencies on any one exchange. Secondary trading venues that can handle material trading volumes and critical functions including closing auctions, as well as independent sources of consolidated market data, can further promote market resiliency and stability.

COMMON SHORTCOMINGS IN EXCHANGES' RESPONSES TO OUTAGE

While each exchange outage was different, we can learn important lessons from the common shortcomings that were witnessed across the majority of the exchanges' responses related to:

- Communication
- Order and Trade Cancellation
- Market Re-open

Communication

The first common shortcoming witnessed across most of the recent outages was insufficient or ineffective communications from the exchanges to market participants. Thorough and timely communication during outages is critical to preserving investor confidence and limiting the cascade of secondary complications.

Key observations included:

- Significant delays in public announcements of the outages
- Lack of centralized and dedicated portals or pages for the dissemination of critical updates in a timely and effective manner, or, where such portals existed, infrequent updates and significant capacity issues inhibiting landing pages from being reached
- Account management and technical teams unprepared to provide, or unresponsive to market participants' need for, timely information
- Updates only provided in the local language

Order and Trade Cancellation

A second common shortcoming was slow or unclear trade / order cancellation processes. The lack of clear and explicit policies and playbooks for trade and order cancellations leaves market participants without vital information regarding their positions and risk exposures. A lack of specificity and discipline around trade / order cancellation procedures represents unacceptable market and operational risk to market participants that impairs the fair and orderly functioning of markets which rely on transparency and certainty.

Key observations included:

- Lack of a well-defined process for canceling trades and/or orders
- Known duplicate trades persisted without clarity on cancellation status/process
- Trades canceled multiple days after the incident even when both counterparties recognized the trade

Market Re-open

A final common shortcoming witnessed across most of the recent outages was mismanaged market re-openings. The timing of market re-open needs to be effectively evaluated, risk assessed and communicated in a timely manner.

Key observations included:

- Across the recent outages there were examples of rushed market re-opens and excessively delayed market re-opens (i.e. next day).
- For rushed re-openings, there were examples of duplicate trades as well as unrectified issues from the initial outage which led to more risk than if the market had stayed closed longer.
- For slow re-openings, the lack of information and communication on re-opening expectations meant participants continued to carry uncertain market and operational risk and investors carried uncertain financial risk for fund / ETF valuations where a closing price was not able to be established effectively.

RECOMMENDED BEST PRACTICES TO MITIGATE THE IMPACT OF EXCHANGE OUTAGES

While every effort should be made to minimize the likelihood of exchange outages in the first instance and ensure that backup systems can seamlessly allow trading to continue, it may be impossible to avoid all exchange outages. Therefore, based on lessons learned from these outages, we recommend the following best practices which will significantly mitigate the impact of exchange outages:

Communications	<ul style="list-style-type: none"> • Develop pre-communicated playbooks centered on different scenarios so the market knows what actions an exchange will take in each scenario • Ensure expeditious notice of any disruptive incidents • Create an easily accessible website / landing page for exchange updates and notifications in local language and English as applicable and/or an open (and muted) teleconference line for the duration of the outage • During an outage, provide updates every 30 minutes at a minimum during market hours, and every 60 minutes at a minimum outside of market hours • Deploy a communication structure which allows rapid horizontal and vertical internal communication flow • Ensure that incident management response, and external communications procedures are fully documented, tested, and effectively deployed
Trade / Order Cancellation	<ul style="list-style-type: none"> • Define procedures around trade cancellations, including parameters such as cancellation price ranges, time limitations, and procedures for validating cancellations • Define procedures around order cancellations, including rejecting new orders during an outage, and removing all existing orders prior to a market re-open communication
Market Re-open	<ul style="list-style-type: none"> • Develop playbooks which outline different scenarios in which exchanges will or will not re-open following an outage and establish clear procedures for re-opening • Premature re-opening of the market can compound operational risks for market participants. Therefore, exchanges should ensure that all problems have been identified and resolved rather than re-opening too soon • In advance of re-opening: <ul style="list-style-type: none"> • Communicate clearly to the market at least 30 minutes prior to opening and re-open on a “round” time increment (e.g., on the hour or half hour). For example, if the exchange is ready to announce a re-open at 1:43pm, the re-open should be set for 2:30pm • Place market in a pre-open state to ensure participants can cancel / amend orders as required • Consult with participants on whether to re-open to ensure there are no outstanding issues which might be further exacerbated by the market re-open • Define a procedure to determine the market closing price in the event where the market cannot re-open (e.g., if the exchange was open on the day, use the last price traded; if the exchange did not open at all, use the previous day’s closing price)
Governance Structure	<ul style="list-style-type: none"> • Examine existing governance structures and implement appropriate governance arrangements where exchange, industry, and regulatory stakeholders can provide oversight and input to executives and staff including: <ul style="list-style-type: none"> • Exchange issues • Strategic development • Rules • Outage playbooks and scenario plans • Conduct and disclose a detailed root cause analysis and necessary recurrence mitigation follow-ups in a timely fashion • Conduct detailed scenario planning/stress testing of potential outages and how the exchange would respond • Complete post-mortems on any outages and publish the results in a timely fashion

ADDITIONAL CONSIDERATIONS TO ENHANCE MARKET RESILIENCY

While the recommended exchange best practices should mitigate the impact of individual outages, further market structure reforms that minimize single points of failure and lessen dependencies on any one exchange will also promote market resiliency and stability. Specifically, we believe that policymakers and regulators should evaluate alternative venues (where possible) and backup systems with a particular focus on:

- How participants define and ensure best execution for their clients in the event of an outage
- What alternatives are available or what back-up systems for the primary venue should be used instead, particularly for the closing auction
- What differences exist in the rules and regulations between primary and alternative venues which may restrain competition and innovation
- How a consolidated tape could support secondary trading venues when the primary venue experiences an outage










CONCLUSION

Exchanges globally have made significant progress over the last 10 years in strengthening their resiliency and business continuity. This has been proven by their ability to rapidly switch to a remote working model and to generally handle the extraordinary trading activities experienced over the last two years. However, experience has also shown that some outages are inevitable and additional attention is warranted on how exchanges react to outages to minimize disruption.

We have laid out several suggestions on improving communications, trade /order cancellation processes, market re-open processes, and governance based on these experiences. We look forward to continuing to work with exchanges as they continue to strengthen their practices.

SUMMARY OF RECENT EXCHANGE OUTAGES

Over the past two years, numerous exchanges globally experienced significant outages and many had challenges in recovery from the outage. Some of these exchanges have subsequently implemented robust recovery mechanisms to ensure increased future market resiliency:

Country	Exchange	Impact	Outage Date
UK	 LSE	Equities	2019-08-16
Canada	 TSX	Equities and derivatives	2020-02-27
Germany	 Eurex and Xetra	Equities and derivatives	2020-04-14
Germany	 Eurex and Xetra	Equities and derivatives	2020-07-01
New Zealand	 NZX	Equities and fixed income	2020-08-25
Japan	 TSE	Equities	2020-10-01
France	 Euronext	Equities, derivatives, fixed income, and commodities	2020-10-19
Australia	 ASX	Equities and derivatives	2020-11-16
India	 NSE	Equities and derivatives	2021-02-24