	HEADERS	DETAILS
1. Intimation of Incident **(T-day, within 1 Hour of the Incident)**	1. Letter / Report Subject -	Reporting of technical glitch
	Name of the Member --	Zerodha Broking Limited
	Member Code -	NSE: 13906; BSE: 6498, MCX: 56550
	2. Designated Officer (Reporting Officer details)	Name: Venu Madhav
		Mobile: 9886100343
		Email ID: venu@zerodha.com
	3. Date & Time of Incident	07-07-2023; 02:47 PM
	4. Exchanges on which Technical Glitch was encountered (NSE, BSE, MCX, NCDEX, MSEI)	**BSE**
	5. Intimation to clients about the Technical Glitch. (Please attach screenshots of communications to clients)	**Bulletin and Tweet**
	6. Network Connectivity Issues / Hardware Issues / Software Issues / Human Error / Other (Please Specify (if more than one, please separate with commas))	Network Connectivity Issues at OmneNEST (an exchange empanelled RMS and OMS vendor level)
	7. Additional Details about the Technical Glitch, if Any.	The issue was Intermittent. The impact was on the order placement, order modifications, and order cancellations between 02:47 PM to 03:30 PM intermittently. The issue was limited to BSE, BCD and BFO segments. The said issue did not affect all users, but only a set of users operating out of a particular Silo (Setup). A bulletin was put up on our website informing clients about the issue. We immediately raised a ticket with OmneNEST. The issue has been fixed.
2. Preliminary Incident Report (T+1 day)	1. Date & Time of Incident & Incident duration (in Minutes)	07-07-2023; 02:47 PM (43 minutes)
	2. Incident Description	The issue was Intermittent. The impact was on the order placement, order modifications, and order cancellations in the BSE, BCD and BFO segments between 02:47 PM to 03:30 PM intermittently owing to what seems to be an network connectivity issue at OmneNEST's end (exchange empanelled RMS and OMS vendor). The said issue did not affect all users, but only a set of users operating out of a particular Silo (Setup). The issue was fixed by the OmneNEST team. RCA from our OMS vendor OmneNEST is awaited.
	3. Immediate action taken (provide brief details)	We immediately notified the OmneNEST team by raising a ticket. A bulletin was put up on our website informing clients about the issue. A tweet on Twitter was put up informing clients about the issue. We have notified the exchange to ascertain if there were any issues at exchange's end which could have caused this glitch.
	4. Business Impact i) Number of Clients Impacted ii) Any other impact	i. A small section of our clients were impacted by the incident. The number of unique users imapcted by this incident were 14.5k and the total orders impacted was 90.2k. There were very few complaints (2672 calls and 739 tickets across all segments). ii. Further, there was no other impact.
	5. Were alternate trading channles available for clients (list all the alternate channels) i) Was there a spike in traffic on the alternate channels available to clients? If yes, provide details.	i. The impacted users had the option of placing orders on NSE during the entire duration of the issue. The issue was Intermittent. The users were able to place orders and modify/ cancel the orders post multiple retries even when the issue was ongoing.
	6. Was the issue caused or encountered by a third-party vendor or service provider? i) Name of the third-party vendor or service provider and a bief description of the issue. ii) Do you have a back-up vendor for the said services	i. Yes, the issue occured due to network connectivity issues at OmneNEST (an exchange empanelled RMS and OMS vendor level). ii. We are in the process of building our own RMS and OMS system.
	7. Was the issue encountered on the Exchange-provided environment? If Yes, kindly provide details of initimation and communication sent to the Exchnage.	We are in touch with the exchange to ascertain the root cause of the disconnection, as multiple brokers reported issue with order placement during that time period.
	8. Did you move operations to the Disaster Recover (DR) site? If, Yes, what was the Recovery Time?	No
	1. Date & Time of Incident & Recovery & Incident duration (in Minutes)	7th July 2023, Time of Incident - 02:47 PM; Recovery - 03:30 PM; Duration - 43 minutes

	2. Incident Description & chronology of events (Please provide brief details)	The issue was Intermittent. The impact was on the order placement, order modifications, and order cancellations in the BSE Equity, BSE Currency Derivative and BSE Equity Derivative segments between 02:47 PM to 03:30 PM intermittently. As per the RCA shared by OmneNEST (exchange empanelled RMS and OMS vendor) on 10th July attached as Annexure 1, the principal cause for the issue was due to the high bandwidth utilization at the exchange link. During the course of analysing further, certain errors were discovered on the Windows server at OmneNEST's end including high memory usage. The said issue did not affect all users, but only a set of users operating out of a particular Silo (Setup).

	3. Business Impact:
	   Please provide details on the points below:
	      i) Number of clients impacted
	      ii) Number of client orders impacted
	      iii) Any P&L impact
	      iv) Any other impact on Business
		i. A small section of our clients were impacted by the incident. The number of unique users imapcted by this incident were 14.5k.
		ii. The total orders impacted was 90.2k.
		iii. No impact on P&L.
		iv. No other impacts.

	4. Details of Client Complaints Received (Please provide details of claims of impacted clients)
	      i) Number of Complaints Received
	      ii) Number of Complaints Settled
	      iii) Number of pending complaints
	      iv) Total amount claimed by complainants
		i. There were few complaints. 2672 calls, 739 tickets and 28 exchange complaint across all segments.
		ii. All the client complaints via tickets and calls have been resolved. 5 exchange complaints have also been resolved.
		iii. There are 23 complaint open at the exchange as on date of submission of this RCA. We are actively working on resolving those at the earliest and have submitted our response to the exchange regarding those complaints.
		iv. The amount claimed by the complainants is approximately Rs. 18lakh.

	5. Root Cause Summary (Pl attach the detailed Report separately)	Initial investigation pointed towards high bandwidth utilization at BSE exchange link. We had encountered a similar incident on the 30th of June 2023 and after the 30th June incident occurred, we proactively reached out to BSE asking them to upgrade our bandwidth from current bandwidth of 4 Mbps to 10 Mbps. This request to increase the bandwidth was made to BSE before any RCA could be carried out. A copy of this email sent to BSE on 30th June, 16:01 has been attached herewith as Annexure 2. Subsequent to our sending the email to BSE, BSE has internally taken up the activity to upgrade the line for which they've sent us emails asking for details, which were provided to BSE. However, this upgradation activity did not happen till the 6th of July. On 7th July, after the said incident occurred, we followed up about our pending request for bandwidth increase to 10Mbps to fast-track it. We further requested the upgrade to 45Mbps once the 10Mbps upgrade would be completed. A copy of this email sent to BSE on 07 July, 19:41 has been attached herewith as Annexure 3. Subsequently the exchange had upgraded our bandwidth directly to 45Mbps for both our primary and backup exchange links on 12th July 2023. Further, unfortunately, we've no control or visibility into exchange leased lines utilization. The exchange doesn't provide us with a monitoring mechanism to monitor bandwidth usage for our exchange links on a real-time basis. Subsequent to the incident on 07th July, OmneNEST carried out an RCA for both incidents of 30th June and 07th July and concluded that the primary cause of the issue was the bandwidth being utilized to its maximum capacity. The delay in RCA by OmneNEST for the incident of 30th June was owing to the fact that OmneNEST had not received the bandwidth utilisation report from the Stock Exchange until 10th July. Even as on the day of reporting this RCA (19th July 2023), the bandwidth utilization for the incident of 30th June is still awaited. On 10th of July, BSE shared the bandwidth report for the incident of 07th of July in which the threshold appeared breached. OmneNEST extrapolated the findings of this report and inferred that the prior incident of 30th June could also have occurred due to the same reason. A request to BSE asking for the bandwidth report of 30th June has been raised and the same is still awaited. Since then, on the 12th of July 2023, BSE has helped us to increase the bandwidth from 4Mbps to 45Mbps as well as increased the capacity from 500 orders per second to 2000 orders per second for each ID across all Silos (Setup) which is well suited to accommodate the peak load. During the course of carrying out the RCA, it was also discovered that the application faced a few errors and that the server had a higher memory usage at OmneNEST's end. However there is no conclusive evidence to demonstrate that the server error is the root cause of the issue since the issue could have occurred in isolation of the bandwidth getting breached. OmneNEST has fixed the server related issues by carrying out a reboot of the application servers. It is pertinent to note that the volumes in the BSE derivates segment have spurted off late and that we are adequately capacitated w.r.t infrastructure such as servers, CPU, memory, disk space, etc. But the hindrance w.r.t this issue was that scaling of exchange-related infrastructure, such as exchange ID capacity and bandwidth upgrade, took time. RCA from OmneNEST shared on 10th July (exchange empanelled RMS and OMS vendor) covering both 30th June and 7th July glitch is attached in Annexure 1.

	6. If the issue was caused or encountered by a third-party vendor or service provider, Please provide the below details:
	      i) What services are being provided by the third-party vendor or service provider?
	      ii) Time taken (in Minutes) by third-party vendor or service provider to resolve the issue.
		i. Yes, the issue was partly caused due to issues (NIC errors) at OmneNest (an exchange empanelled RMS and OMS vendor).
		ii. Not Applicable

	7. Has a similar issue been encountered prior to the submission of this RCA Report?	A similar issue was encountered on June 30th, 2023.
	8. Details of long-term preventive action (please provide all action points for long-term preventive action with the date from which they will be implemented) (please use additional sheets if necessary)	1. We have spread our customers across multiple physically independent data centres, OMS installations, and many leased lines with backup lines. Hence only a fraction of users will be impacted in such scenarios. 2. We have increased the bandwidth from 4Mbps to 45Mbps for our exchange link as well as increased the capacity from 500 orders per second to 2000 orders per second for each ID across all Silos (Setup). 3. We have requested BSE to provide dashboard for monitoring bandwidth usage for our exchange links on a real-time basis. 4. OmneNest are monitoring for any possible spike in RAM usage and NIC errors. Furthermore, stand by server has been tested comprehensively and observed to be working fine and ready to switch over in case of any eventualities.
3. RCA of Technical Glitch Incident (T + 14 days)	9. Provide a detailed Architecture Diagram of the System.	Attached