Stress testing at lunchtime: Intraday scenario analysis for 0DTE option portfolios

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Contents

1. Introduction

Zero-days-to-expiration (0DTE) options – contracts that expire by the end of the current trading day – have surged in popularity, becoming a dominant force in equity derivatives markets. These ultra-short-term options allow traders to leverage intraday market moves for quick gains. But they also carry significant risks. With no "tomorrow" for 0DTE contracts, portfolio managers cannot afford to wait out market turbulence. Any adverse move before the closing bell can immediately translate into losses.

This white paper discusses why intraday stress tests and scenario analysis are crucial for portfolios with many 0DTE positions. We explore how real-time "what-if" scenario modelling can highlight potential tail risk events, enabling traders and risk managers to take proactive steps before any unpleasant shocks arise.

> "In recent years, 0DTE options (especially on major indices like the S&P 500) have exploded in volume."

2. The 0DTE phenomenon and intraday risk

In recent years, 0DTE options (especially on major indices like the S&P 500) have exploded in volume. By May 2025, 0DTE options on the S&P 500 Index became the single most-traded expiration, averaging over 1.5 million trades per day and accounting for over 61% of total S&P 500 options volume[2]. This surge reflects broad participation by both institutional and retail traders seeking to capitalize on intraday market swings. The attraction is clear: 0DTE options offer a low-cost, high-leverage way to speculate on or hedge same-day market moves, including events such as economic data releases or US Federal Reserve (Fed) announcements.

However, the very qualities that make 0DTE options appealing also make them high risk. With only hours or minutes until expiration, these options exhibit extreme sensitivity to immediate market fluctuations. Even a minor move in the underlying asset can cause a 0DTE option's price to swing dramatically. Sudden news or economic events can rapidly change an option's value within a short period. For example, a surprise headline at lunchtime can send an option that was comfortably out-of-the-money into deep in-the-money territory (or vice versa) in a blink.

The time decay (theta) is also incredibly steep for 0DTE options. Their extrinsic time value evaporates hour by hour. If the market does not move in the anticipated direction quickly, a 0DTE contract can lose most or all of its value by the day's end. In short, trading these instruments is akin to a high-wire act requiring vigilant monitoring and swift decision-making.

A unique but fundamental aspect of 0DTE trading is the absence of overnight risk. Positions are opened and closed (or expire) within the same session. The advantage is that traders avoid exposure to overnight gaps or news, and every day starts with a "clean slate." No overnight risk means you will not be hit by a surprise earnings warning or geopolitical event after trading hours, which is beneficial for risk control.

But the flip side is that you must manage all the risk in real-time during the trading day. As mentioned earlier, there is no "tomorrow" to make up losses or wait for a rebound. Any adverse movement

[1] Morningstar. Popular 'zero-day' options saw record share of trading volume in May as retail traders piled in. June 2, 2025.

before the closing bell directly hits the profit and loss (P&L) statement. This immediacy intensifies the risk management challenge, and intraday volatility and tail events become a central concern.

Intraday market jumps are not rare occurrences. Research finds that intraday jumps in indices are both frequent and impactful, and short-maturity options embed a significant premium for this intraday tail risk[2]. In one 2025 study on S&P 500 0DTE options, the implied premium for jump risk (sudden large moves) was nearly twice as large as the premiums for normal diffusion volatility risk[3]. This suggests that 0DTE options heavily reflect – and are sensitive to – the probability of extreme intraday swings. A portfolio loaded with 0DTE positions is essentially sitting on a powder keg of intraday gamma (rapid delta changes) and exposure to market volatility. Without robust intraday risk controls, a quick 1–2% market move can send such a portfolio into significant loss territory well before the day is over.

3. Why intraday stress testing is important

Traditional risk management often relies on end-of-day reports or overnight risk analyses, such as Value-at-Risk (VaR), calculated on closing positions. But for 0DTE portfolios, end-of-day is simply too late. By the time regular stress tests or reports are available, the contracts in question have expired and any damage has already been done.

Managing a 0DTE-heavy portfolio requires intraday vigilance. Intraday stress testing means running scenario analyses on your positions during the trading day. For example, you could simulate right now what would happen to your P&L if the market were to drop 1.5% in the next hour. This proactive approach is crucial because it allows the portfolio manager to foresee potential losses and act before those losses become realized.

Because there is no lifespan for 0DTE contracts beyond the end of the current trading session, you cannot simply ride out a drawdown. In a multi-day trade, a manager

[2] Intraday Jumps and 0DTE Options: Pricing and Hedging Implications, Milos Bozovic, University of Belgrade – Faculty of Economics and Business, July 2025.

[3] Intraday Jumps and 0DTE Options: Pricing and Hedging Implications, Milos Bozovic, University of Belgrade – Faculty of Economics and Bu0siness, January 2025.

might hold through a dip, hoping for recovery the next day or later in the week. With 0DTE options, if a scenario looks bad (say a sharp drop at 2pm), by 4pm it is game over. There is no next session to recoup – the options will expire.

As a result, the emphasis shifts to real-time risk prevention. Intraday scenario analysis functions as an early warning system. It spotlights how extreme yet plausible market moves could impact the portfolio's value within the current day's horizon.

Market regulators and clearing houses have also recognized the importance of intraday risk management, particularly due to 0DTE options growth. Notably, the Options Clearing Corporation (OCC) introduced a new intraday risk charge in 2024 specifically targeting the risk of 0DTE options exposures between margin calls[4]. This move came after the rapid growth in 0DTE trading raised concerns that the normal end-of-day margin process was not capturing the true intra-session risk. In other words, a firm could appear adequately margined at yesterday's close, but by noon today its 0DTE positions might create outsized risk that would not be caught until too late.

The OCC's intraday margin add-on is essentially a stress test applied during the trading day on members' positions to ensure they can withstand sudden swings. It is a real-world affirmation that intraday stress tests are essential for safety when dealing with same-day expiring options.

Portfolio managers are increasingly factoring intraday scenarios into their risk frameworks. For example, an asset manager running a 0DTE option overlay strategy (e.g., selling calls or puts for income) needs to examine how an intraday market move would affect not just the option P&L but the total portfolio (underlying assets plus options).

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By performing such "what-if" scenario analysis on a combined stock-plus-option portfolio, a manager can see how, say, a midday 2% drop in equities would impact the overall portfolio value[5]. This holistic intraday view is key to avoiding "surprises" where an options overlay intended to generate extra yield suddenly causes a disproportionate loss on a bad day.

4. Real-time scenario analysis techniques

Intraday scenario analysis involves hypothetically "shocking" certain market inputs (such as asset prices, volatilities, or interest rates) and instantly recalculating the portfolio's value and risk measures under those conditions. Modern risk systems can do this on demand, acting as a sandbox for portfolio managers to explore "what-if" questions: What if the index falls 1% from here? What if volatility jumps 10 points? What if interest rates suddenly move 25 basis points (bps) today?

By iterating through such scenarios, one can map out the portfolio's vulnerability to various intraday events. Below, we outline key scenario analysis techniques relevant for 0DTE option portfolios.

[4] Securities and Exchange Commission. August 6, 2024.

[5] Morningstar. What-if Financial Scenario Analysis With Examples, C Pham and M O'Leary, 10 April, 2025.

Underlying price shock scenarios

The most straightforward scenario is a shock to the underlying asset price. For equity index options, this means simulating sudden index moves (up or down) intraday. Typically, risk managers will define a range of price shocks (e.g. –3%, –2%, –1%, 0, +1%, +2%, +3%) and compute the portfolio P&L outcome for each.

A key consideration is that for options, a price shock alone is not the whole story. You also need to consider implied volatility changes that might accompany the price move. However, as a starting point, one can run pure price shocks with volatility held constant to see the directional exposure.

For example, imagine a portfolio is short a large number of at-the-money (ATM) 0DTE call options on a stock index. A price shock scenario of +2% on the index (with volatility unchanged) would likely show a significant loss, since those calls would go deep in-the-money. A –2% shock might conversely show a profit, as the calls expire worthless. Plotting P&L across a range of ±X% moves reveals if the portfolio is net long or short biased and where non-linear effects (gamma) kick in.

For intraday risk, typical shocks might be somewhat smaller than ±2% (since giant moves are less likely in an hour or two), but tail scenarios should still be included. A 1.5%–2% intraday drop is not unheard of (e.g., on a major news shock), and even if historically rare, including an extreme scenario like ±5% can be eye-opening for understanding worst-case exposures. Recall that the S&P 500 declined by over 20% on Black Monday in October 1987, so a ±5% scenario may not even be extreme enough.

Volatility shock scenarios

Volatility shock scenarios focus on changes in implied volatility levels, which significantly affect option prices. For 0DTE options, implied volatility can change extremely fast. For instance, if a surprise event increases uncertainty for the remaining hours of trading, traders might bid up implied volatility even as time is very short. To test this, one can shock the volatility input up or down and see how option values respond.

Often, price and volatility shocks are combined in a coordinated way, because market crashes typically coincide with volatility spikes (and rallies often coincide with volatility drops). Risk managers use volatility-coordinated scenarios to reflect this behavior.

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In a coordinated scenario, you can define a rule such as, "For every X% drop in price, assume Y% increase in volatility." For example, a simple rule could be: a 1% market decline within an hour leads to a 5 point increase in implied volatility, and a 1% market rise leads to a 2 point decrease in implied vol. This kind of rule is in line with observed patterns that volatility's reaction is non-linear (volatility tends to rise much more on a large down move than it falls on an equivalent up move)[6].

Coordinated price and volatility scenarios are very informative for 0DTE portfolios because they capture the volatility exposure (vega) during a market move. For instance, consider a trader who is short 0DTE put options (essentially selling insurance for the day). If the market drops 1.5% in a short time period, not only do those puts go in-the-money, but their implied volatility will also shoot up as demand for protection rises, making the loss even larger.

A scenario that shocks the S&P 500 down 1.5% and VIX (volatility) up proportionally will show a more realistic P&L impact on that short put position than a "naïve" price-only shock. The combined effect often reveals much heavier tail losses for short option positions, underlining why volatility shocks must be included in stress tests.

On the flip side, if a portfolio is long options (e.g., a long straddle strategy betting on intraday movement), a volatility spike scenario could show an outsized gain. The scenario analysis helps quantify how much of a "volatility cushion" the portfolio has (i.e., would a volatility jump offset some underlying loss or amplify it?).

It should be noted that vega is typically much smaller for 0DTE options than for longer-dated options, and the influence of delta, gamma and theta often have a much larger impact on 0DTE option values, especially as time passes during the trading day and expiration nears.

Interest rate shock scenarios

Interest rate changes in a single day typically have a minor effect on index option prices, especially 0DTE options, since 0DTE rho values (sensitivity to interest rates) are so low. However, if a portfolio includes 0DTE options on stock indices or futures, changes to short-term interest rates (like the risk-free rate or funding rate) could matter in certain extreme cases (e.g., a large rate shock impacting deep in-the-money options, or a surprise rate change affecting the underlying index's volatility).

In practice, intraday interest rate shocks are more relevant for fixed income portfolios (like Treasury futures options or other rate-sensitive derivatives) rather than equity 0DTE options. Still, an advanced scenario tool will allow interest rate curves to be shocked as part of multi-factor stress tests.

For completeness, consider a scenario where, during the day, there is a sudden expectation shift in Fed policy (perhaps due to an unscheduled central bank statement) – short-term interest rate futures could move, impacting equity indices as well as changing discount rates. A comprehensive scenario could include an interest rate jump alongside equity and volatility moves to simulate a macro event.

The key point for 0DTE equity option portfolios is that interest rate shocks are usually a minor factor unless they cause large moves in the underlying index. Nevertheless, rate shocks can be layered in to explore cross-asset impacts, especially for institutions who might hold diverse intraday positions including FX or rate options expiring that day.

[6] MenthorQ. Understanding the Volatility Surface & School of Economics and Finance, Victoria University of Wellington. Volatility Surfaces: Theory, Rules of Thumb, and Empirical Evidence.

5. Tools and technologies for instant risk analysis

The capability to perform the intraday scenario analyses outlined above hinges on having advanced analytics tools. Real-time risk systems and pricing models are the engines behind intraday stress testing. These tools can instantly re-price a portfolio under hypothetical conditions, allowing portfolio managers to interactively probe their risk. Key features and technologies include:

- **High-speed option pricing models**. To stress test in real time, the system must compute option values and Greeks very fast. Given 0DTE options may require models that handle near-expiry quirks (e.g., numerical stability for options with only hours left), vendors often optimize these calculations. Modern analytics platforms can price large option portfolios in milliseconds. This means a manager can slide a price or volatility input and immediately see the P&L impact without lag, supporting a quick decision during the trading day.
- **What-if scenario interfaces.** Many trading and risk platforms provide a "scenario" or "what-if" interface where users can input shocks. For example, a risk manager might input "Index –1.5% and VIX +5" and the software will output new valuations for all positions. Some systems even allow drag-and-drop scenario analysis or graphical sliders to adjust market levels and observe P&L changes dynamically. This user-friendly design encourages frequent use of scenario testing because it becomes as easy as checking a quote.
- **Pre-defined scenario libraries.** Common stress scenarios (e.g., market crash, volatility spike) might be built into the software for one-click use. While those are often multi-day scenarios, they can be adapted to intraday timeframes. Having presets saves time, as a trader at lunch can quickly run the "market drops 2%" scenario without manually setting each parameter.
- **Visualization and dashboards.** Plotting scenario results in graphs helps in understanding the risk. Interactive dashboards might show P&L vs. underlying price, P&L vs. volatility change, P&L vs. time change, or even distribution of outcomes. Some platforms will overlay the current portfolio Greeks (delta, gamma, vega, theta) on such charts as slopes or curvature, giving intuition on how P&L would change for small vs. large moves, and how the Greeks evolve as time passes and expiration nears.
- **Integration with live data.** Intraday stress testing tools are usually connected to live market data feeds. This is important because any scenario likely starts from the current market state. As the day progresses, the base prices and implied volatility change, so a scenario run at 11am will need recalibration by 2 pm. Good tools update positions and Greeks continuously so that the scenarios are always using the latest positions and market inputs. This way, intraday scenario analysis remains a live exercise, not a static (and stale) one done earlier in the day.
- **Risk alerts and limits.** Advanced systems can be configured to continuously monitor scenario outcomes and alert users if any cross a certain threshold. For instance, a trader might set an alert as follows: "If the portfolio's P&L under a –2% market scenario exceeds –$X (a loss threshold), flash an alert." This effectively automates the stress test throughout the day. The moment current conditions approach a danger zone, the system flags it. Some clearing brokers similarly use intraday risk analytics to warn clients of potential margin calls or position reductions when scenario losses breach risk limits. This is akin to what the OCC is enforcing for its clearing members[7].

[7] Risk.net. OCC introduces new intraday risk charge covering zero-day options, 23 May 2024

It should be noted that while technology greatly aids with intraday scenario analysis, the scenarios still rely on human judgment to choose parameters and interpret results. The purpose of scenarios is not to predict exact outcomes, but to explore a range of possible behaviors of the portfolio[8]. In other words, scenario tools bring the concept of "what if" to life, helping risk managers imagine the extremes with concrete numbers rather than guesswork. This builds confidence and preparedness.

Importantly, all the above capabilities are intended to be platform-neutral in this discussion. Whether using an in-house risk system or a commercial platform, the core functionality will be similar. The goal is to enable the portfolio manager to conduct intraday stress tests in a seamless way.

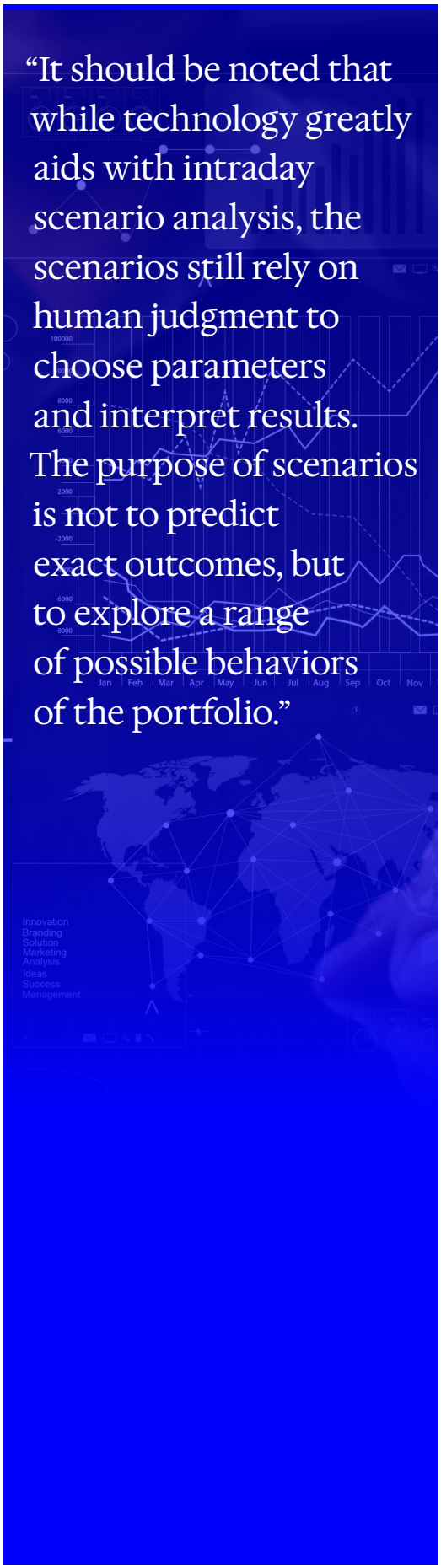
6. Mitigating tail risks in real-time

Performing intraday scenario analysis is only half the battle. The other half is taking action based on those insights. The ultimate benefit of stress testing at lunchtime is to identify potential tail risk outcomes and enable timely mitigation. If a scenario reveals an unacceptable loss or risk profile, a prudent manager will adjust the portfolio before the scenario can become reality. Here are key strategies to mitigate tail risks in real time.

Hedge immediately if necessary

The moment a stress test shows a dangerous exposure, consider putting on a hedge. For example, if the "index –2%" scenario looks catastrophic due to short put exposure, a manager can buy put options (or sell futures) as a hedge right away. Options markets are usually liquid enough to get protection across many strikes for same-day expiration (especially on major indices such as the S&P 500 and Nasdaq) – though perhaps at a cost.

The cost of buying option hedges early in the day is often more expensive than later on, due to their higher time value, but this is not always the case. Sometimes midday prices are higher than in the morning due to expectations of high volatility to expiration. Regardless, hedges are often a price worth paying to cap your downside. Once you realize you are sitting on a short-gamma powder keg, it may be worthwhile to buy protection.



[8] Investopedia. Scenario Analysis Explained: Techniques, Examples, and Applications.

Scale back or unwind positions

Intraday risk analysis might reveal that the size of a position is too large for comfort under stress. The manager can then choose to scale down. For instance, if a fund is short 1,000 call options and sees that a scenario of a market rally would blow through risk limits, they might close out half of them around lunchtime to reduce exposure. With 0DTE options, time is of the essence – by late afternoon, liquidity may dry up or it might be too late to transact without significant slippage. So, acting sooner in the day (once a risk is identified) yields better outcomes. Some systematic 0DTE traders actually program automatic cut-offs. For example, they will close all positions if losses reach a threshold by 2pm – essentially an intraday stop-loss regimen. Scenario analysis helps inform where those thresholds should be.

Adjust strikes or convert positions

In some cases, a portfolio manager might adjust the structure of positions to be more robust. For example, the manager could convert naked short puts into spreads by buying puts closer to the money (creating long put spreads) or further out-of-the-money (forming short put spreads). If short straddles look perilous, one could convert them to iron butterflies (buying wings on both sides) to cap risk. If short calls are risky, the manager could roll them up to higher strikes, potentially taking immediate losses but pushing the risk further to the upside. Intraday scenarios show which strikes or areas are most at risk. A savvy trader can re-center or rebalance the portfolio accordingly. This is akin to repositioning your bets once new information comes to light.

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Use longer-dated expiries for hedging

A challenge with 0DTE positions is that after a certain point, hedging with same-day options might be ineffective as there is too little time left. In that case, traders might use options expiring a few days out to hedge intraday moves. For instance, at 3pm, rather than buying a nearly expired option (which has almost binary outcomes and wide spreads), one could buy a one- or two-day option to hedge a tail scenario that could develop into the close. The P&L impact for the day can still be managed, and you can always unwind the hedge at end of day if the risk passes. The key is to be creative and flexible. The scenario test identifies what needs hedging, and the trader chooses how best to hedge it given market conditions.

Pre-emptive risk reduction on event days

If scenario analysis in the morning (or prior evening) suggests that a particular known event (e.g., a Fed meeting at 2pm) could be very risky for the current portfolio, the manager might proactively reduce exposure before that event. This is a pre-emptive mitigation strategy.

For example, if a fund is running an intraday strategy but sees that a big economic report at 1pm could cause a large loss in the most adverse situation, they might decide to go lighter or flat going into that announcement. This is common among professional day traders and short-term proprietary traders, as they often flatten out positions ahead of major announcements to avoid being caught. Institutions similarly might not want to have all their chips on the table at that moment unless explicitly betting on it.

It is worth noting that sometimes the best action is to do nothing, but in an informed way. If scenario tests show that even extreme moves would be within tolerances (perhaps the portfolio is well-hedged or limited-loss by construction), a manager can have confidence to hold positions through choppy markets. In that case, the scenario analysis provides peace of mind that "we can survive the worst-case scenario XYZ, so we'll let the strategy run until expiry." Having this confidence is valuable. It prevents knee-jerk liquidations on rumors because you have already war-gamed the scenarios.

For many institutional investors, especially pension funds and insurers, a central risk concern is avoiding shocks that threaten long-term funding or solvency and create liquidity or collateral stresses. Even if they rarely trade 0DTE options outright, they may have similar intraday risks from other derivatives or overlay strategies. The principles of intraday stress testing apply broadly – identify the intraday tail risks and neutralize them.

A hedge fund might focus on avoiding a single-session drawdown that breaches daily risk limits or undermines monthly performance, while a pension fund running an equity overlay or writing covered calls may worry more about large moves that strain collateral or truncate upside. By proactively stress testing intraday, both types of investor can take steps to avoid being caught off guard by late-day market swings.

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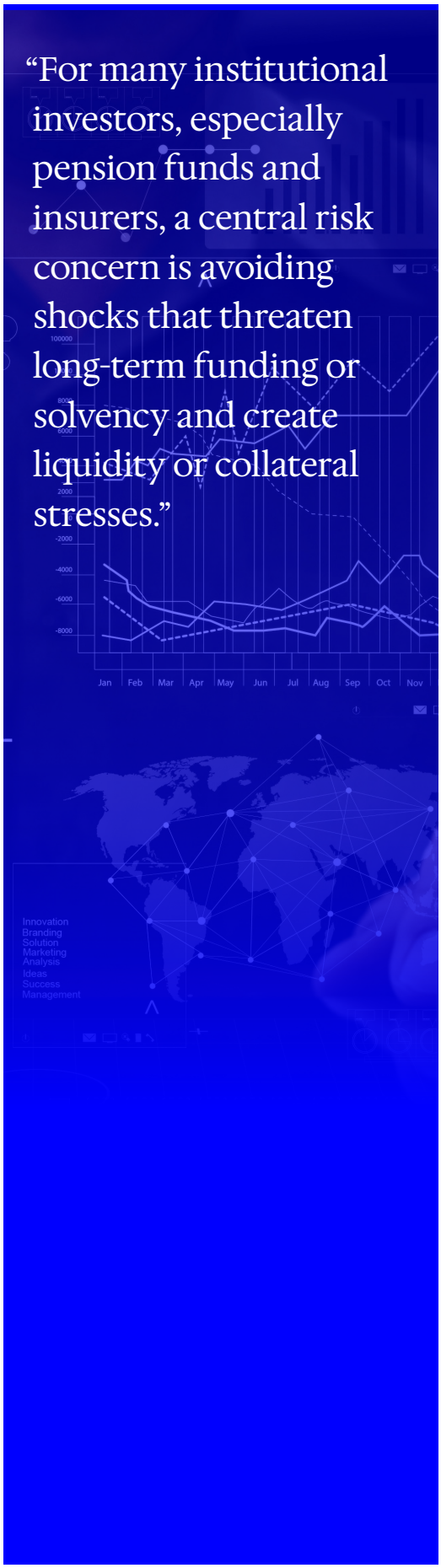

7. Conclusion

0DTE options have transformed intraday trading from a slow grind into a high-stakes sprint. The very characteristics that make these instruments attractive – high leverage, no overnight risk, immediate feedback – also demand a new level of intraday risk management.

Intraday stress testing and scenario analysis are indispensable tools for anyone managing a portfolio loaded with 0DTE positions. By running "what-if" scenarios during the trading day, portfolio managers can visualize how sudden market events (be it an index tumble, a volatility shock, or a news surprise) would impact their positions before those events happen in reality. This proactive insight is critical because there is no cushion of time with 0DTE contracts – you either manage the risk now, or you face the consequences by the day's end.

The rise of advanced analytics software and real-time risk platforms has made intraday scenario analysis feasible at scale. Today's 0DTE traders have access to tools that let them instantly shock markets in their models – dropping an index by 1%, popping volatilities by 10 points, or shifting rates – and immediately see the P&L impact.

These tools, powered by fast option pricing engines and user-friendly interfaces, bring a level of agility to risk management that matches the speed of modern markets. The result is that risk checks are no longer relegated to overnight batches – they are happening continuously, even at lunchtime on a volatile day, serving as an early-warning system for the portfolio.

> "The core message for practitioners is clear. As there is no "tomorrow" for 0DTE contracts, you must interrogate your risks in real-time today. Intraday scenario analysis is not about predicting exactly what will happen. It is about being prepared for whatever could happen."

The core message for practitioners is clear. As there is no "tomorrow" for 0DTE contracts, you must interrogate your risks in real-time today. Intraday scenario analysis is not about predicting exactly what will happen. It is about being prepared for whatever could happen.

Traders who integrate intraday stress testing into their routine are like pilots flying with radar – they won't be blindsided by the storm ahead. They will see it coming on the screen of their scenario analysis and navigate around it.

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