The Enterprise Spreadsheet:
Pushing Toward Transparency

Adam Sussman | V07:004 | February 2009 | www.tabbgroup.com

Vision

Capital markets are at an historic crossroads. Clients need more guidance than ever, economic conditions keep eyes fixed on the bottom line, regulatory changes are imminent, and advancements in technology and information processing make the world move faster than ever. In order to thrive—not merely survive— in these unprecedented times, organizations need to be nimble, responsive and thrifty.

In the midst of this turmoil, there are initial signs that institutions will need to adapt to the following trends: transparency, risk management and diffusion. Transparency will come in the form of additional reporting requirements. Improvement to risk management will lead to a better understanding of market risk and operational controls; a popular mantra will be updated to read: "Know your client, *know your counterparty better."* Despite the wave of consolidation and contraction occurring in the financial sector as firms collapse or merge in order to survive, there is an undercurrent of diffusion as firms seek to mitigate their reliance on counterparties by spreading their business across more companies. The market's collective need to prevent firms from becoming "too big to fail" will encourage firms to "load balance" their spending and partnerships against a wider array of entities.

Transparency will require firms to make additional improvements to their enterprise data management (EDM) efforts. However, organizations will no longer have the luxury of spending their ways into compliance by building new-fangled platforms or databases. Rather, efforts will focus on cataloguing, auditing and managing thousands of spreadsheets—spreadsheets packed with complex financial contracts, P&L statements, and links to external databases and market data. With such an encyclopedic index of mission-critical data, the requisite reports can be generated without having to re-architect the technology infrastructure or change the way people work.

Risk management is also set to undergo drastic upgrades. Improving market-risk analysis requires an expert understanding of EDM and content management; because scenario testing can be computationally intense, technology must be capable of crunching the data necessary to imagine these scenarios. However, the need to maximize IT dollars is leading firms to look for better ways to maximize existing hardware.

Meanwhile, as the academics bicker about the validity of Value-at-Risk (VaR), truly measurable improvements must be made on operational risk to detect frauds (like a Madoff) or prevent a rogue employee (like a Jérôme Kerviel) from jeopardizing the firm. The ability to perform trend analysis on changes made within a file or database (and the ability to alert the appropriate personnel when those changes meet certain criteria) would be a good first step toward protecting the firm against careless errors and malicious activity.

The diffusion of capital markets revenue will be facilitated by transparency and risk management. As the reporting mechanisms across the industry improve, it will become easier for firms to aggregate information from multiple sources. This aggregation, in turn, will provide the industry with more robust counterparty risk assessments. Trust will be established through primary, empirical means rather than through subjective factors such as reputation, or lagging indicators such as credit ratings. A wider array of business relationships will reduce single points of counterparty risk; having more relationships gives firms the additional benefit of being able to respond to changing climates by quickly establishing business ties.

The implementation of a more tightly managed environment must not impede the flexibility required to respond to clients' needs.

Although increased transparency and internal risk controls are ultimately client-driven, neither constitutes the core-value proposition of most capital markets institutions. Investors and investment advisors need securities and investment vehicles that align with their financial objectives. In economically uncertain times, clients need highly customized products that will respond to future economic conditions. This means that financial institutions must continue to create, price, process and settle complex instruments—but under a more stringent set of reporting requirements.

In fact, it is in the alphabet soup of financial products that radical change is most likely to occur. No financial instrument has ever before received the kind of public whipping that is currently being meted out to Credit Default Swap (CDS), Collateralized Debt Obligations (CDO) and other credit derivatives. More recently, public acrimony has turned against a class of more transparent products, leveraged Exchange-Traded Funds (ETF), which have been blamed for increased market volatility.

Regardless of the fate of any one type of instrument, there is little doubt that the next wave of financial innovation will couple customization with both transparency and risk management. Regardless of whether a brokerage firm is servicing institutional investment managers or retail clients, the rules of engagement are changing. Whether an investment-management company is running a 1940 Act fund or a private investment vehicle, we will surely see a rise in disclosures and fiduciary obligations. While TABB Group does not believe that any part of the financial landscape will be legislated out of existence, regulatory requirements among different entities will converge.

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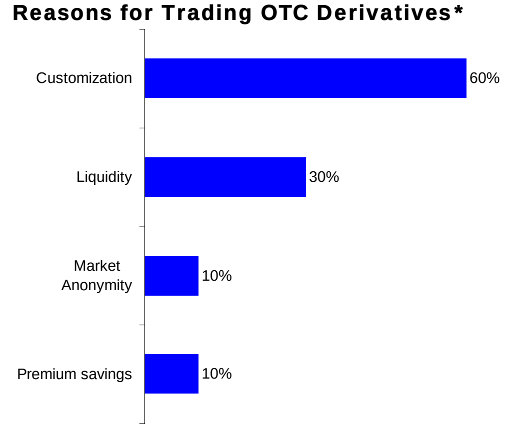
Introduction: Agility and Control

The over-the-counter (OTC) derivatives market is a microcosm of what is and will be happening in financial services. It is a market that uniquely reflects the needs of clients, the concerns of regulators, the opportunity among banks, and the role of technology. The problems and solutions for OTC derivatives have broad applications to other parts of the financial services industry.

One of the services with which a derivatives, or structured product, desk provides clients is the ability to quickly structure, price and execute an agreement that replicates the returns of an underlying index or basket of securities with customized terms and conditions. Besides highly standardized products like total-return swaps and barrier options, the spreadsheet is a key tool in creating, pricing and analyzing these products. In today's risk-averse environment, however, the derivatives desk must balance the creativity and speed that clients demand with the pressure that banks are under to better manage their exposure to various forms of risk. These trends are driving a redesign of the way spreadsheets are deployed, run and managed across the financial-services industry, from global commercial banks to Greenwich-based hedge funds.

Agility is a vital component of the OTC derivatives desk: One of the primary reasons to use an OTC contract is the ability to customize its various components. Exchange-traded products, on the other hand, offer a limited number of choices for variables such as expiration date, notional value and strike price. While most desired contract terms can be created synthetically by using a basket of exchange-traded contracts, for most funds it does not make much sense to try to do that with internal resources. As a result, customization drives a good portion of sell-side OTC activity, as illustrated by data collected from our 2008 report, "Equity Options Trading 2008" (Exhibit 1).

Exhibit 1
Reasons for Trading OTC Derivatives*



Source: TABB Group
**Multiple responses results in percentages above 100%*

Over the last year, funds have been using OTC derivatives to manage a number of market exposures, including but not limited to:

- **Unexpected events:** Increased optionality is incorporated into these instruments to add further protection against "improbable" events.
- **Correlation:** The high degree of correlation between asset prices drives firms interested in principal protection to look more closely at the correlation components of their instruments.

- **Volatility:** Recent market volatility causes funds to look for contracts with floating strike prices that determine the payout of an optionality covenant.

However, there are any number of ways in which clients can manage their exposure to various factors and events. Even fairly standard and straightforward derivatives contracts, such as total-return equity swaps and Credit Default Swaps, have diverse applications and customizable features, resulting in a large number of possible contracts. Among more complex products, the potential number of variations is positively staggering. Indeed, the number of variations is only limited by the creativity of its participants.

The evolution of the OTC derivatives markets poses a unique challenge to the industry: How can we program for features that we don't know about, or don't know we need yet? An OTC derivatives desks acts as a quasi-research and development laboratory for financial instruments. As an R&D lab, the desk needs the flexibility to use different options-pricing models, yield curves, currency pairs, covariance matrices and more. To try and build that flexibility into a formal business application, with its own user interface, is a Sisyphean task. Jackson Pollack would not have liked CAD. And because many of the ideas that come from clients or traders do not wind up being feasible products, it is far more cost efficient to let traders and clients exchange ideas in spreadsheet form rather than modify the trading system. Even when their ideas do become products, many are so limited in their distribution and lifespan that IT resources would only be wasted in trying to address them in proprietary trading platforms.

The result is that much financial engineering is done in spreadsheets, either using a Microsoft® Office Excel® add-in, such as Microsoft Solver Foundation, or in standalone mathematics environments such as Mathematica or MATLAB. These tools allow desks to quickly pull data and formulas together quickly to get a sense of how the contract behaves in different scenarios. And because nearly every computer on the planet can open, view and modify the contents of a spreadsheet, sharing the results of the analysis and the contract's details is a snap. Its ubiquity and familiarity partly explains why, after decades of advances in more formal trading system applications, the spreadsheet is still standing.

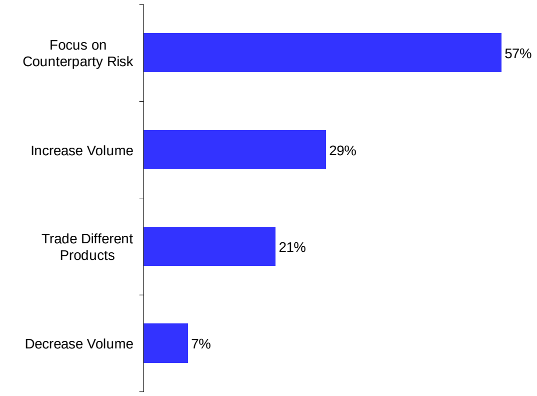
However, as a client request becomes a trade, and a single trade becomes a steady revenue stream, the banks must imbue this new product with regulatory, compliance, operations and risk safeguards. We have moved from the sandbox to the stadium.

Increased Risk Reporting Requirements

The importance of agility increases in uncertain times. Banks need to be able to respond to clients' needs while adjusting to changing fiscal and regulatory realities. While the demand for customized contracts could benefit the OTC derivatives business, the amount of capital available to banks to support principal activity has nearly vanished.

In addition, as fears of insolvency continue to plague the financial sector (see Exhibit 2), participants are spending more time assessing potential counterparties' financial health. Since the collapse of Lehman Brothers, the buy-side has ratcheted up its analysis of counterparty balance sheets, treating a trade as if it were taking on the debt of that counterparty. The buy-side is also requesting more information regarding the internal risk controls of the banks, trying to make sure that neither a rogue trader nor ineffective risk-management process will threaten its contracts.

Exhibit 2
How Financial Crisis Impacts Buy-Side Behavior Trading OTC Derivatives*



Source: TABB Group
**Multiple responses results in percentages above 100%*

The inevitable creation of a risk regulator will also bring new requirements: Armed with high expectations and wide jurisdiction, risk regulators will demand in-depth analyses at the instruments on the books of banks, hedge funds, and anyone else trading OTC derivatives and other unregistered securities. Banks will need new processes for ushering new and innovative products into the reporting workflow. Most hedge funds and asset managers will need to build much more robust reporting facilities.

"We don't really have a place where exposures are combined and you can see your full position in any one spot."
– US Asset Manager

As a result, banks' ability to trade will rely on the timeliness and accuracy of their mid- and back-office capabilities. Clients will begin to use banks' own proprietary benchmarks to determine the attractiveness of the counterparty; regulators will use them to look at systemic risk. Post-trade processes, from trade affirmation to daily settlement, will need to become more efficient and timely. Valuations, collateralization and margining will need to move closer to real-time.

Neither investors nor regulators have forgotten how easily rogue traders can bring about staggering bank losses. Operational risk will be elevated to a top-line concern—just as much a priority as revenue, reputation and regulation. The goal is transparency: We can only respond to what we can see. Thus, at every level, every proprietary model, strategy or application will be not only monitored and documented (e.g., content management), but managed through specific controls and process checks. The process is one of identifying, validating, monitoring and quantifying. The course from front to back office should be an easy one, rather than a drag on productivity.

All of this streamlining essentially boils down to risk management. Although the debate about Value-at-Risk (VaR) is important, there are plenty of unrewarded risks that banks must be more aggressive about eliminating so that they can maximize what little risk they can now take. In this new model, change management assumes a more critical role in proactively guiding the decision-making process since it must handle the identification, validation and quantifying steps, through compliance with evolving policies that cover this new way of doing business. Auditing assumes a somewhat expanded role, but as recent experience has taught, a proactive analysis is better than ad-hoc responsiveness.

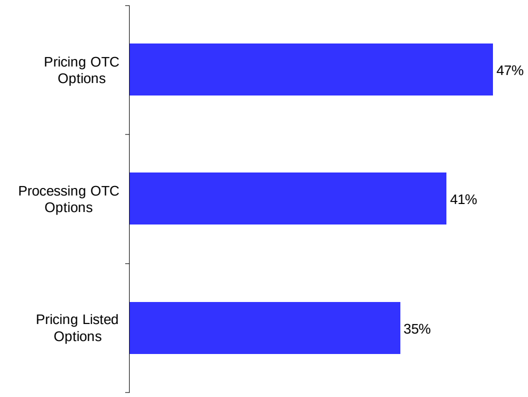
The challenge that we face is implementing all of these processes without impacting the agility of the front office. At the heart of this balancing act is the fate of the spreadsheet. Excel is a ubiquitous application on the trading desk because it is so flexible, allowing traders to easily structure and calculate an instrument's price. But, as trading risk increases, so does the tendency to want to “unhook” the spreadsheet from the desktop and connect it to the enterprise. Basic operational controls, such as authentication and validation, need to be enforced. Risk managers want to make sure that everyone is using consistent pricing formulas. Complex instruments also require a faster calculation engine than can be found on a personal computer.

IT departments are now faced with the unenviable task of solving this conundrum when cost cutting is at its most rampant. Their most common solutions are either pulling functions out of an Excel file and into a series of stored procedures and libraries, or building the necessary requirements into a more formal business application. These types of migration paths not only meet the low-cost development needs that we face in tough economic conditions, but also have the advantage of faster and more efficient delivery times. Vendors' and firms' internal IT innovations are helping blur the line between where the spreadsheet stops and the enterprise begins, resulting in a balanced approach to maintaining agility while increasing operational and compliance controls.

The Spreadsheet Myth

Since 2003, TABB Group has interviewed traders at hundreds of buy-side and sell-side institutions. And though these interviews have spanned the globe and the entire investment-management value chain, two software applications, the Bloomberg Terminal and Excel, were mentioned again and again. These interviews serve as reminders that market data (inputs) and analysis (outputs) are at the core of the investment process. Indeed, many financial instruments and portfolio strategies have been created, executed and processed using nothing more than a combination of Bloomberg and Excel. Nowhere is the usage of spreadsheets more prevalent than it is in the derivatives markets, where traders create the underpinnings of a new financial contract (see Exhibit 3).

Exhibit 3
Usage of Excel Among the Buy-Side Trading Equity Derivatives*



Source: TABB Group
**Multiple responses results in percentages above 100%*

Oftentimes, the use of spreadsheets is equated with more manual and less sophisticated processes. The myth of the spreadsheet is that as a function, process or business line becomes more mission-critical, it should be moved off of a spreadsheet and into a more formal, controlled environment. However, this approach oversimplifies the issue. Spreadsheets—either alone or in conjunction with other components—can often serve the same function as a business application.

> "We do all of our modeling, using a combination of Wombat, Bloomberg, Capital IQ and Excel."
> – US Hedge Fund

Within three common components of the IT infrastructure—user interface, storage and computing power—financial services firms are redesigning Excel to meet more stringent internal and regulatory requirements. The user interface layer of an application can be the most sensitive; because it is the part of the software that end users are most exposed to, it can be a source of great tension. Excel's advantage is that its interface is quite familiar to experienced users, and these users can customize the interface to meet their individual needs. Excel also enables innovation because of its openness, yet another reason why it is the preferred foundation for building models, scenario analysis and other such functions.

However, the openness that makes Excel an excellent analytics tool is what also makes it less than ideal for other tasks. Traders don't use spreadsheets to manage orders in fast-moving markets because the quantity and velocity of the market data and outbound order messaging requires a more robust display and communications platform, like the Bloomberg terminal or an Execution Management System (EMS).

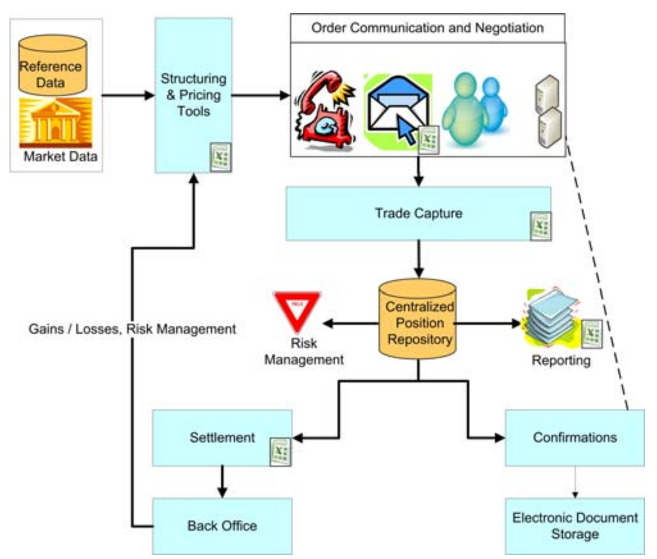
The storage layer of IT infrastructure is where the myth of the "desktop spreadsheet" is perhaps the most prevalent: If all the trades performed by a desk are stored on individual traders' local drives, the company's ability to measure and manage risk is severely impacted—never mind that the company also assumes operational risk the size of the Grand Canyon. However, there is no causal link between the use of spreadsheets at the interface layer and the location where the information is stored. (Besides, firms can use Excel Services and other passive remote-monitoring technologies to track locally stored files without traders ever knowing.) Aggregating information within spreadsheets—not eliminating spreadsheets altogether—is really the key to improving trading desks' transparency, managing risk and increasing post-trade processing.

The last layer of IT infrastructure we will address is computing power. While everyone recognizes that Excel is the workhorse of the desktop, it is not often thought as a racehorse. When a user is analyzing a large set of data using sophisticated mathematic calculations, these calculations can take hours to perform if processing power is limited to that of a standard personal computer. High-performance computing (HPC) solutions for Excel are removing the computational limitations of spreadsheets tied to the desktop by allowing Excel to access the processing power of the entire grid. Using Graphics Processing Unit (GPU) computing is another avenue that financial engineers are exploring now that NVIDIA has introduced double-precision calculations and easier ways to port computing code to the GPU language.

The Workhorse of the Workflow

For any one task within the OTC derivatives workflow, the way in which the spreadsheet is structured should be determined by a combination of user requirements, impact on financials, and the task's role within the workflow. The ubiquity of spreadsheets throughout the life of the trade is what makes creating best practices for spreadsheets so interesting—and so challenging. Whether there are separate spreadsheets

Exhibit 4
The OTC Derivatives Workflow



Source: TABB Group

throughout the workflow or a single spreadsheet passed through the process, the way in which the files are managed will change as the trade is structured, priced, executed and settled (see Exhibit 4). The requirements for spreadsheet management must be created based on the function a given spreadsheet is intended to perform because there is no single set of requirements that satisfies the different processes.

The structuring of a new OTC product (or the derivation of an existing product) is where a spreadsheet is most likely to resemble the spreadsheet that most users imagine: At this stage, it's a relatively free-form file crowded with Excel-based formulas, pivot tables, user-defined links to data and perhaps a few macros, all running and stored on the user's desktop. These are the kinds of files found on every analyst's PC. If the analysis is particularly complex, though, we begin to see a shift away from the user-defined functions to externally compiled code, perhaps running off of an HPC cluster with Excel Services. In this case, the shift off of the desktop is driven by an analyst's need for more flexible computational power, not enterprise controls (see Exhibit 5).

Exhibit 5
Shift Toward Enterprise Controls

	Formulas	Computing	Management	Storage	Market Data
Structuring	Excel-based formulas & User Defined Functions	Determined by time constraints and complexity	File-based	File back-up on user request	Manual inputs or user-defined links
Pricing	XLLs, DLLs, & other external code		Cell-based	File-back up on user request	Limited manual inputs; links controlled
Trade Details	NA		Cell-based	Central database	NA
Reporting	XLLs, DLLs, & other external code		File-based	NA	All administered links
Valuation / Settlement	XLLs, DLLs, & other external code		Cell-based	Central database	All administered links

User Flexibility → Enterprise Controls

Source: TABB Group

When a contract is ready to be priced, the need for enterprise controls increases: These controls will assure senior management that the product is being done at a price that is both competitive and profitable. The ability to enter inputs manually needs to be restricted and any external inputs— such as what source to use for the S&P 500 index or the London Interbank Offer Rate (LIBOR)—should be enterprise-wide standards that are written into formal contracts. These practices would help eliminate erroneous trades and discrepancies with counterparties.

Once a trade is executed, codified by the ISDA agreement and captured in Excel, the trade's details should fall under the conventions of EDM. Given the complexity of some trades, OTC derivatives and structured products pose particularly thorny issues for EDM. In some instances, trade details and all downstream process data—including affirmation, confirmation, reporting, risk management and settlement—are exported to a database for central storage. But this is not always a practical solution for OTC products, given the products' complexity and the time it takes to design an appropriate database. Instead, the trade details are locked down and when other processes need that information, they access the file and rerun the calculations as necessary. It is the process by which the spreadsheets are accessed and refreshed that forms this central repository.

Reporting, both external and internal, is another area in which there is a need for interoperability between multiple systems; it's in reporting that the successes and flaws of EDM are magnified. The information must be culled from a multitude of spreadsheets and/or databases. For external reporting, a client's trades are typically located across a multitude of files. Each one of these files must be accessed and run, with the results being passed to a specialized reporting tool (they may even come full circle, back to Excel). While the files that generate the final report must all be managed at the cell level, these files are likely to be managed at the file level.

The situation is similar for valuations, and ultimately, for risk management. It is from a firm-wide reporting perspective where the need to de-link the location of the spreadsheet from the computing power is necessary. TABB Group's conversations with sell-side organizations and enterprise spreadsheet-technology providers revealed that there are literally thousands of spreadsheets that contain data and formulas that can have material impact on a firm's financial health. The OTC derivatives contracts would be the most complex to refresh, with links to numerous external data sources and mark-to-model calculations such as volatility curves. Time becomes even more of a factor when performing risk management calculations. To calculate Value-at-Risk (VaR) and other enterprise risk figures, Monte Carlo simulations, stress testing and scenario analyses need to be run. In turn, these calculations all require the valuation of all open OTC derivatives contracts—in conjunction with the total value of other instruments—under a wide range of conditions. Calculating counterparty risk is yet another exercise in extreme data aggregation and calculation, requiring millions of rows of reference and entity data.

There has never been any question as to how embedded Excel is in many critical components of capital markets, but because it has always been tethered to the desktop, its ubiquity was accepted though perhaps not welcomed. With the advent of better enterprise controls, centralized storage and Excel's support of high-performance computing, the idea of a spreadsheet within an application framework is no longer foreign or scary.

The Transparent Enterprise

Over the last few years, calls for an overhaul of the U.S. financial services regulatory structure have been getting louder. Shortly after Bear Stearns was rescued from bankruptcy by taxpayer-supported JPMorgan Chase, the U.S. Department of the Treasury hurriedly released its long-awaited “Blueprint for a Modernized Financial Regulatory Structure.” On January 15, 2009, the Group of Thirty, an influential international think tank for financial services, issued a report of similar scope.

Exhibit 6 is an image based on the top 100 terms (minus common words and industry jargon) used in the recommendations sections of those two documents. The image only underscores the need for a regulatory structure that allows for the necessary “information and authority to monitor systemic risk.” In addition, Barney Frank, current Chairman of the House Financial Services Committee, has called for a “financial services systemic risk regulatory agency” that would have the authority to ask institutions for information so the Committee can better monitor the health of each institution and the industry as a whole.

Exhibit 6
Top 100 Terms in Recent Regulatory Proposals
(Size of Word Equals Number of Mentions

Source: Group of Thirty, US Treasury, Wordle.com

Regardless of how this new regulatory authority comes about, there is little doubt that institutions will have additional reporting responsibilities, and will be encouraged to streamline the processes that relate to the reporting of risk positions. The Federal Reserve, which will likely be deputized as the risk regulatory, has been pushing banks for years to become more efficient in processing OTC derivatives; now the Federal Reserve will have a greater stick, broader authority and the power to verify the information that institutions submit.

If they’re required to report risk-related positions to a powerful regulatory body at regular intervals, of course banks are going to make doubly sure their current IT architecture will support these new requirements. The exercise will be similar in scope to the series of checks and balances publicly listed companies had to implement in response to the Sarbanes-Oxley Act.

As a result, the way information is managed within a spreadsheet will need to be in sync with the new reporting regime’s requirements. And any information that requires manual input will only impede the institution’s ability to efficiently and accurately report information. In the not-so-distant future, enterprises will need to publish trade-related information contained within a spreadsheet in near real-time. In fact, Excel already has many features that support this goal, such as the ability to define a column or a row making it easy for an external application to search and extract relevant information. Therefore, the best way to meet reporting requirements may not be to implement a more rigid and centralized research and trading platform, but rather to build aggregation tools for decentralized and non-standard information.

One of the disadvantages of high-productivity applications such as Excel is that it is often difficult for firms that use these applications to protect their confidential information and processes. Traders who use these types of applications store their files locally—and because Excel files are so simple to generate, most traders' drives are packed with a large number of discrete files that others in the firm can't access. Within the trading environment, where these files contain agreements with substantial financial considerations, any imbalance between productivity and control can cost a company significant money. In today's economic environment most all firms are erring on the side of caution, but draconian measures that force the workflow into a centralized application is more likely to curtail the employees' effectiveness than it is to improve operational excellence. Reducing risk at the cost of revenue is not always feasible. The survival of the OTC derivatives business, from options to unstructured products, is dependent on an IT infrastructure that optimizes for innovation, control and standardization.

Best Practices

Attempting to achieve these objectives requires the close examination of, and requirements gathering for, a number of different spreadsheet protocols and processes including:

- Accessing and modifying spreadsheets and functions accessible through the spreadsheet
- Tracking and auditing the changes made to a spreadsheet or template
- Making sure all "live" trade spreadsheets are accessible by management software
- Standardizing data structures
- Making sure that there is a consistent calculation used for common and critical components of a trade, e.g. options pricing

Controlling access to spreadsheets is easy for information security professionals and network administrators to do. Network administrators are the first line of defense: They are the ones who give users the appropriate read/write access to a folder or file. (It is more common, however, that file read/write permissions are controlled by passwords.)

The next requirement is tracking and auditing the changes that authorized users make to files. Though Excel has user-level “track changes” capabilities, with literally thousands of spreadsheets moving from front-office to back-office and from clients to banks and back, version control should not always be in the hands of the original user. Traditional version-control methods, such as tracking changes within a file or locking workbooks and forcing a “Save As,” do not proactively track and report file changes to upstream applications. Nor do such methods allow for fine-grained tracking of changes to embedded macros and user-defined functions. From a file perspective, Microsoft’s Sharepoint server brings enterprise content management (ECM) tools to Excel. The accessibility, authentication and modification protocols can be more easily implemented. Workflow functionality could help formalize even the most ad-hoc of trades and produce secure, reliable audit trails. While it has always been relatively easy to see when a file was modified (and who modified it), ECM functionality allows files to be more actively managed.

Over the last five years, independent service vendors (ISVs) such as ClusterSeven, Finsbury and Prodiance have introduced advanced tracking, alerting and management functionality for spreadsheets. Essentially, each file that these software systems manage is copied to a separate location while leaving the original file intact. On a regular basis, a new copy of that file is copied and compared with the existing file. Differences between those files, including everything from value changes to function updates, are logged along with other relevant information. Changes to particularly important files can trigger alerts to high-level personnel.

These systems track an exhaustive number of file characteristics, any of which could drastically change the pricing, valuation and settlement outcomes of any OTC derivative. If a cell that was previously linked to an external data source for an interest rate or securities price is modified to a constant, the software would know nearly instantaneously and be able to alert interested parties. Changes to formulas within a file are tracked in an effort to detect erroneous changes or intentional fraudulent updates. If the number of times a file is accessed by a particular user suddenly increases, it could be a sign of improper or unauthorized access. All of these features bring the control that firms have over their spreadsheet data closer to that a traditional business application.

In order to bring all of these spreadsheets a company has under management, the first step is knowing how many spreadsheets are out there that can have meaningful impact on its financial health. Although file scans can locate all of the firm’s spreadsheets and analytics can look at the complexity and usage of the files, ultimately, a good deal of hands-on cataloguing must occur to fully grasp which processes are impacted by each spreadsheet. Only then will the information provided by the enterprise management software have true meaning.

Locating trade errors is one of the primary benefits of spreadsheet management. There are numerous ways in which an error can be introduced as a trade moves through the trading lifecycle. This is especially true of spreadsheets, where user error is common. Even among Wall Street's finest, there are countless stories of deleted workbooks and files, changes to data or formulas, and lost or stolen intellectual property. One source of error that has been largely solved is manual data entry. Instead of having inputs manually entered, spreadsheets connect to data sources and import the appropriate data. Those areas of the spreadsheets are locked down so that only a few authorized users can change the source of that data. When those changes are made, the change is logged as part of an audit trail.

Locking down certain parts of the spreadsheet is another positive step toward reducing data errors. As the trade details are updated throughout the negotiation process—they're emailed back and forth by the two counterparties, opened and possibly modified during the affirmation process—there comes a point in these negotiations at which cells should no longer be modified. A procedure needs to be implemented that stores the cells' current values and locks them down at that point; if those cells are modified in any way, the appropriate personnel should be contacted.

Another best practice of spreadsheet management is to access data points, pricing models and other analytics from outside the spreadsheet. Moving sensitive calculations out of the spreadsheet and accessing them from external sources provides several advantages: First, it ensures that everyone involved in the trade lifecycle (and perhaps the organization) uses a consistent methodology. Second, for complex calculations, the use of a dedicated server, or grid architecture, can deliver significant performance enhancements. Third, it allows quantitative analysts and IT personnel to more easily share improvements to the calculations and code.

Cost / Benefit Analysis

The decision to introduce tighter IT controls on a product, or perhaps move a function to a formal business application, is not so straightforward. In addition, the three types of improvement (interface, storage, computing) will differ not only according to the point in the process but also according to the product itself.

Most firms would agree that there are basic spreadsheet management capabilities that should apply to all spreadsheets of financial import, such as authentication and auditing. Unfortunately, the decision about whether to introduce tighter IT controls can be quite subjective. Companies should consider the following factors when making this decision:

- **Number of Events:** Any change to the state of a contract, including a new trade, change in assignment, exchange of payments, corporate action and/or default

- **Contract Characteristics:** New and complex contracts have fewer enterprise controls on them than mature and standard contracts

- **Error Rates:** Percentage of trades that experience errors

- **Notional exposure:** The total value of all outstanding contracts

For the structuring and pricing process, the critical determinants are focused on front-office concerns, revenue and profits. Although the initial creation of products can be aided by slick interfaces, it is the preference of the end user that matters, so there is little to be done on the enterprise level. Common financial-engineering calculations are often distributed via a dynamic-link library (DLL), Excel add-in (XLL) or other external code. This shared codebase not only standardizes the process but also acts as a stepping stone toward moving most of the computations onto a centralized architecture.

Once a product is created, spreadsheet templates or new order entry screens can be created to add control and efficiency to the process. This is a critical decision because spreadsheets or screens also become the pricing and trade capture mechanism, which determines the efficiency of the post-trade process.

While notional exposure seems an easy way to determine the necessity of IT resources (“We have billions in exposure, we need to put some money into this”), it is an insufficient factor. Indeed, a company would realize little benefit from an IT initiative focused on one-off contracts regardless of the initiative’s size. Among participants of the 2008 International Swaps and Derivatives Association’s (ISDA) Operation Survey, high volume was mentioned as the second most important factor in how quickly a trade confirmation is completed. Focusing IT on operational improvements to a product that has a higher number of new trades, even if the notional is not as substantial, has a higher payoff.

A contract’s characteristics are also important in determining the degree of standardization and automation that can be brought to the post-trade process. Once standards are in place it is easier to design a template for that product. It is also likely that there is significant volume in the product so efficiencies are quickly realized. On the other hand, the leading factor in delayed confirmations is new products. New products also tend to have higher profit margins. If regulators get serious about tying trading limits to error rates, firms will want a good process for quickly bringing new products into the fold.

It is easy to say that firms should always strive to improve the trade workflow. However, at a time when tens of thousands of people are being laid off from the Capital Markets industry, the cold reality is that the coming years promise declining revenues, fewer new products and less innovation. Companies will rely on making incremental improvements to existing architectures and processes. It is a time when we need to build on what we have, rather than try to start from scratch.

Conclusion

Excel has always been a shape-shifting application. The financial equivalent of a blank page has allowed end users to adapt the application to any imaginable use. In the trading world, Excel is the modeling laboratory, negotiation tool, trade capture software, books and records, and an input into almost every post-trade process. It has and will always be the workhorse of the desktop. But, the inherent individualism of the spreadsheet can be a negative in the current environment, as firms want to impose tighter controls and monitoring capabilities. In addition, increasingly complex calculations make the power of the desktop insufficient. One might think that the easy solution is to look for heavier applications to solve these issues. However, Excel is continuously being redesigned by its creators and users and it has undergone its most dramatic shift from the desktop to the enterprise.

Financial firms are entering a period of greater scrutiny and more stringent regulations: The new focus will be on controls and risk management. For trading desks and their support staff, there will need to be an intense review of process workflow, documentation practices, authentication protocols, and data and content management. During this review, there is a unique opportunity to bring these thousands of sensitive spreadsheets into the fold of the enterprise, creating a virtual enterprise spreadsheet application while still leaving the traders with the flexible, efficient tool they've grown to rely on.

As these thousands of spreadsheets are audited, firms must first identify the cells and formulas that are the most critical to the integrity of that spreadsheet. Rules should be created around those cells and formulas to alert the appropriate personnel when they are violated. Second, a detailed mapping of the external data sources used can identify any inconsistencies or inefficiencies in the current use of market data. The use of these sources can then be brought into alignment and rationalized. Third, the review process should analyze how long it takes to refresh these files. Time-critical files that were being delayed because of overcrowding on a desktop or server could be moved to a separate server or HPC cluster. The workhorse is being reengineered into a racehorse.

Last but not least, it will be critical to continue to enable innovation. The organizations able to incorporate new products into a more structured workflow with the least amount of constraints will be in the best position to grow under the current conditions.

The ability to adapt to one's surroundings has always been a hallmark of survival. Whether it is software or business models, our industry has the unique ability to affect the necessary transformation.

About

TABB Group

TABB Group is a financial research and strategic advisory firm focused exclusively on capital markets. Founded in 2003 and based on the methodology of "first-person knowledge," TABB Group analyzes and quantifies the investing value chain from the fiduciary, investment manager, broker, exchange and custodian. Our goal is to help senior business leaders gain a truer understanding of financial issues and trends so they can grow their business. TABB Group members are regularly cited in the press and speak at industry conferences. For more information about TABB Group, go to www.tabbgroup.com.

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