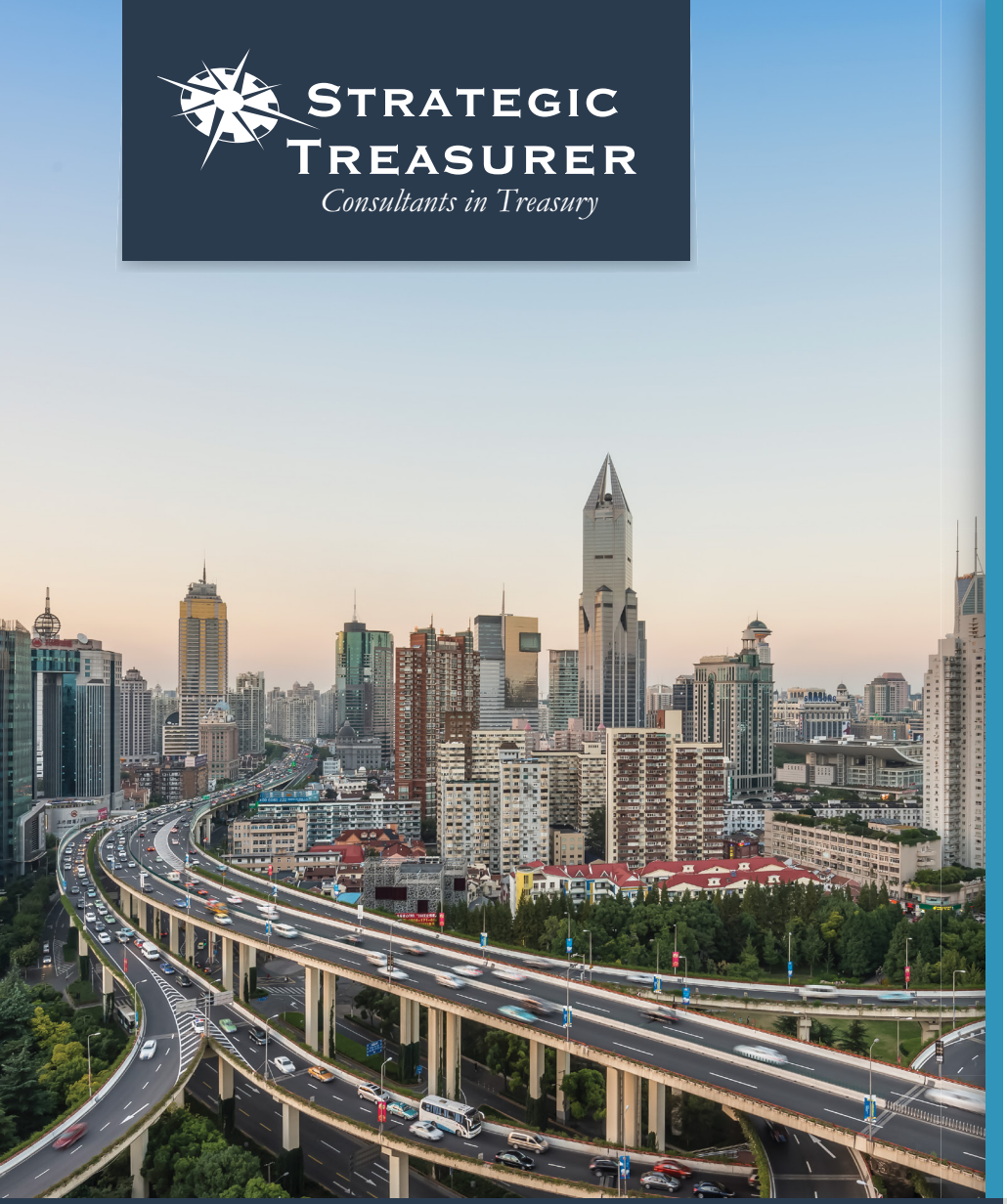
Strategic Treasurer
Consultants in Treasury



TREASURY AGGREGATORS

Bank Connectivity Solutions

- Streamlined Payments & Reporting
- Enhanced Security
- Simplified Compliance

ANALYST REPORT
2017

SPECIAL REPORT - ECS FIN

This special report provides in-depth coverage of the treasury technology industry at large with an exclusive look at the solution set offered by ECS Fin.

ECS Fin

ANALYST REPORT CONTENTS

*Our mission is to **elevate & enhance** the practice of treasury **by advising** individual clients **& informing** the industry at large.*

We hope you enjoy this report & find it useful.
Thank you for reading.

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STRATEGIC TREASURER
Consultants in Treasury

Since Strategic Treasurer was founded in 2004, we have helped hundreds of corporate clients face real-world treasury issues. Our senior consultants have practical, hands-on experience in corporate treasury environments and have held senior management and leadership roles across numerous industries. Strategic Treasurer's consultants are known not only for their expertise in the treasury space, but also for their responsiveness to client issues, thorough follow-through on every project, and deep understanding of the industry. Our focus as a firm centers on maintaining true expertise in the treasury space, which is accomplished through a combination of annual industry surveys, industry discovery meetings, and insightful discussions with both corporate clients and treasury technology vendors. As a result, our awareness of the market is both global in scope and rich in detail.

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VENDOR COVERAGE & ANALYSIS

Purpose of Report

WHY IS THIS REPORT NECESSARY?

How many banking partners do you have? Do you use the same connectivity method for each of your banking partners? Are all of your banks connected to SWIFT, or do you have to connect to some of your banks through other networks or individual bank portals? In recent years, continued economic globalization and technological advancements are allowing today's organizations to transact with clients and partners across the world at a rapid pace. While these capabilities are valuable for firms looking to expand their global footprint, the comprehensive web of connections that now exists between corporates and their business partners can be difficult to maintain. This is particularly true for organizations operating in multiple world regions and dealing with high payment volumes across a number of bank relationships.

In most organizations, it is treasury's responsibility to manage the constant stream of global payments activity, much of which is originating in different currencies and passing through a variety of banking channels. Treasury is also tasked with ensuring that these payments are made in a secure environment and in compliance with the various sanctions and regulations that exist worldwide. Thus, for firms sending out thousands or even millions of payments every month, the process of managing payment activity can quickly escalate in complexity and make it difficult for treasury to keep their payment processes up-to-date and in line with the evolving needs and expectations of the business. This global payments complexity leaves many treasury departments striving to increase efficiency, security, and visibility wherever possible, while also maintaining compliance with the various regulatory statutes that exist across the payments and banking landscape. It is due to these heightened payments and connectivity needs that the treasury aggregation industry has formed.

This report will provide in-depth analysis of the technology solutions referred to as "treasury aggregators" by Strategic Treasurer. Specifically, this report will help readers:

- Understand what a treasury aggregator is, and what differentiates these solutions from other financial technology offerings.
- Evaluate the business case for treasury aggregators, including a breakdown of specific drivers and industry challenges that have resulted in an elevated need for their services.
- Pinpoint the unique benefits provided through the use of treasury aggregation technology.
- Identify best practices regarding the selection and implementation of a treasury aggregator and its integration with a TMS, ERP, or other technology solution.
- Analyze the products and services suites offered by some of the leading providers of treasury aggregation technology.

IN THIS REPORT

There are two treasury aggregator checklists provided in this report. The first checklist, provided on page 7, has been created to help firms interested in adopting a treasury aggregator to identify the unique set of advantages and benefits that could be obtained through their use. The second checklist, provided on page 28, contains a set of questions that firms interested in undergoing a selection process can use to identify the scope of functionality that is offered by a particular vendor and to more effectively differentiate the range of services that are available across the aggregation landscape.

WHAT IS A TREASURY AGGREGATOR?

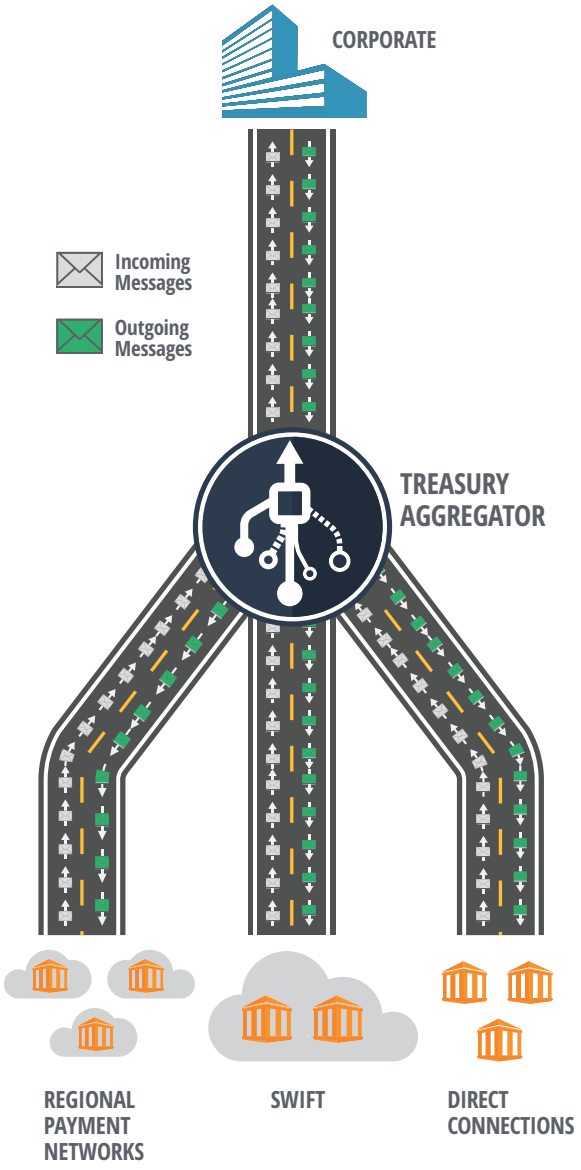
The term "treasury aggregator" may not be one that most treasurers or corporate practitioners are familiar with. Strategic Treasurer coined the term "treasury aggregator" to define the set of solutions that provide streamlined connectivity for all a corporate's banking activity, including balance reports and wire transfers, through the SWIFT network, other networks, and direct connections. The connectivity services provided by treasury aggregators are desirable because they drastically reduce the complexity involved in managing multiple bank portals or payment systems. By offering a single connection point, treasury aggregators are able to provide corporates with simplified banking processes, enhanced cash management and visibility, streamlined payments and reporting features, and robust security and compliance tools. While there are a number of solutions that offer these functionalities, there was formerly no term or industry grouping that accurately classified them. Thus, the term "treasury aggregator" was created to group these solutions into a single, definitive category.

A helpful analogy to think of when envisioning the role that a treasury aggregator plays is to picture the treasury aggregator as a system of roadways that connect an organization to its banks. For optimal travel, a road must be large enough to handle all incoming and outgoing traffic and have specific channels that direct traffic to the appropriate destination. If the road network is inefficient, transportation will be slow and harrowing. Similarly, if a roadway is not large enough to handle the amount of traffic passing through it, travel between destinations on the road will be impeded. However, if the infrastructure is well-established and up-to-date, a roadway system can be used to travel quickly and safely between two locations.

Just as the best roads allow for thousands and even millions of cars to travel between cities every day, so treasury aggregators serve as the major connectivity channels that allow corporates to efficiently and securely interact with all of their banking partners worldwide. In today's world, most organizations connect to a variety of individual banks and bank networks. Treasury aggregators help with this process by connecting to each individual bank channel used by a client and managing the payments process from origination through to delivery and reporting. This includes formatting each message a corporate must send or receive into the preferred format of the recipient, ensuring compliance with all relevant sanctions and regulatory statutes, and providing a secure environment for payments and reporting activity. By building and maintaining the roadways through which corporates can interact with their banks, treasury aggregators are able to provide simplified, efficient, and secure connectivity services for their clients.

A helpful analogy to think of when envisioning the role that a treasury aggregator plays is to picture the treasury aggregator as a system of roadways that connect an organization to its banks.

What Is a Treasury Aggregator?



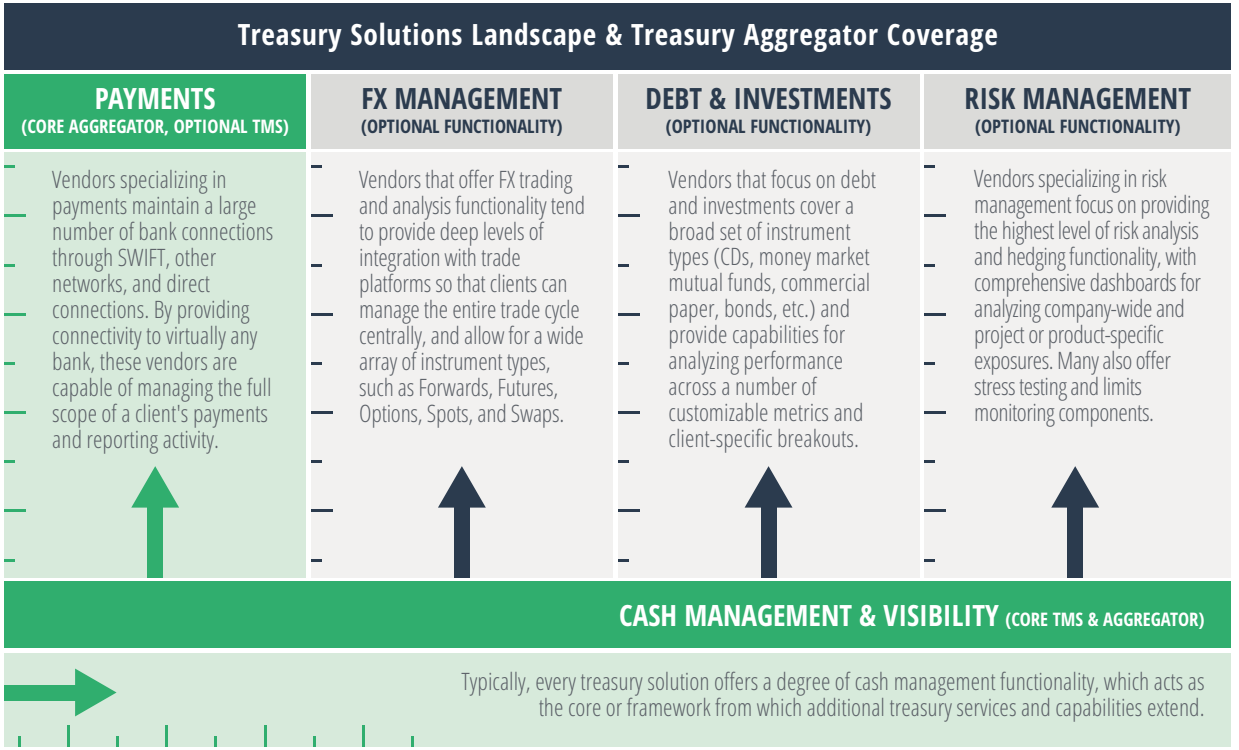
Treasury Solutions & Available Functionality

ARE TREASURY AGGREGATORS & TMS THE SAME THING?

Treasury aggregators specialize in the area of bank connectivity. These vendors provide connectivity services to clients that rise beyond what is offered through a standard SWIFT Service Bureau or TMS. Treasury aggregators distinguish themselves by offering connectivity to SWIFT non-SWIFT banks, through direct (H2H) connectivity and other networks, so that they can connect a corporate to virtually any of their banking partners regardless of location, size, or complexity. Through these connectivity services, aggregators offer streamlined payments and reporting functionality, as well as cash management, compliance, and bank account management services. With regards to the treasury solutions landscape shown to the right, the provision of these services places aggregators in both the payments and cash management sectors.

When looking at the full treasury solutions landscape, there are five primary service areas or sectors that a particular solution could seek to cover. These sectors include cash management, payments, FX trading, debt and investment activity, and risk management. In most circumstances, a TMS will provide some degree of cash management functionality, and then may also offer functionality in one or more of the other sectors. Depending on the TMS, functionality may span one or two sectors, or may cover all five. However, for a solution to be considered an aggregator, it is required that it provide full coverage in the payments sector. Additionally, most aggregators will offer cash management capabilities that complement their payments and connectivity services. While some aggregators may offer functionality in other sectors outside of payments and cash management, the provision of those services is irrelevant as far as their aggregator status is concerned.

There are several treasury solutions available that are capable of providing top-notch bank connectivity to their clients as part of a broader set of treasury tools. These solutions would be classified both as a TMS and as a treasury aggregator. However, there is a larger group of solutions that, while offering a wide array of treasury functionality, are not able to provide this level of bank connectivity services. The provision of these high-end payments and connectivity services is ultimately what differentiates an aggregator from other treasury solutions; even if a solution covers virtually every treasury function other than bank connectivity, it would still not be considered a treasury aggregator.



CHECKLIST: WHAT CAN A TREASURY AGGREGATOR DO FOR ME?

While treasury aggregators provide a valuable set of services to organizations, it can be difficult to determine just how significant the value-add of such a solution would be. Generally, it is companies with a fair-to-heavy amount of global complexity and moderate-to-high levels of payment activity that see the most benefit through the implementation of a treasury aggregator. However, there are a range of connectivity needs that treasury aggregators are capable of addressing. If you are interested in understanding whether an aggregator would be beneficial to your organization, the following questions will help you identify the unique advantages that an aggregator could provide.

What Can a Treasury Aggregator Do for Me?

1. ARE YOU CONDUCTING BUSINESS ON A GLOBAL SCALE?

Today, over one-third of companies are operating in 20+ countries. This creates complexity in a number of banking and payments-related areas, as more banks, currencies, and payment types come into play. If you are operating in multiple countries and have yet to implement any sophisticated bank connectivity or payments solution, chances are your current banking, payments, security, and compliance processes are in need of an upgrade.

2. IS IT DIFFICULT TO MAINTAIN VISIBILITY TO ALL YOUR BANKS AND BANK ACCOUNTS?

Nearly half of all corporates today are originating payments using six or more banks, and over half of all companies use more than 100 bank accounts. Managing bank activity through multiple banks and bank channels can be complicated, especially if multiple bank portals or spreadsheets are used to view and analyze transaction activity. Companies relying heavily on bank portals and spreadsheets could have their processes simplified through the use of an aggregator.

3. DOES MANAGING PAYMENT ACTIVITY TAKE EXCESSIVE AMOUNTS OF TIME?

Half of all companies generate more than 10,000 payments globally every month. Many others generate more than 100,000 or even 1,000,000 payments monthly. Treasury teams that are burdened by the excessive time it takes to track and manage this activity could use a treasury aggregator to streamline and centralize their payment operations in order to increase end-to-end visibility and control.

4. IS FRAUD A TOP CONCERN REGARDING YOUR TECHNOLOGY INFRASTRUCTURE?

86% of companies have experienced fraud attempts within the past two years. Because of this, fraud prevention has become a top priority for treasury. For organizations looking to ensure that their payment processes are as secure as possible, adopting a treasury aggregator allows for additional layers of protection on payment files in transit and on payment information that is stored on a cloud or network.

5. ARE COMPLIANCE EXPECTATIONS PROVING TO BE A LARGE BURDEN?

Over the past decade or so, the compliance burden placed upon organizations has risen drastically as bodies like OFAC and FinCEN introduce more rigid regulatory requirements. Treasury aggregators provide enhanced sanctions screening and data validation checks on all incoming and outgoing messages and provide a central repository for bank account information that makes it easier to manage FBAR and other reporting requirements.

6. WOULD YOUR TREASURY TEAM BENEFIT FROM INCREASED PAYMENTS EFFICIENCY?

Over one-third of all corporate treasury departments consist of three or fewer employees, and many teams lack the staffing levels necessary to efficiently complete all their tasks. Treasury aggregators help reduce treasury's workload by consolidating all payment activity through a single portal and automating many of the payment generation and reporting tasks that have bogged down treasury in the past.

Widespread Economic Globalization

INDUSTRY CHALLENGES DRIVING TREASURY AGGREGATION

INDUSTRY CHALLENGE: WIDESPREAD ECONOMIC GLOBALIZATION

The topic of economic globalization is one that is frequently covered in Strategic Treasurer's Analyst Report Series. This is because the widespread globalization of business that has occurred over the past several decades has had a monumental impact on the everyday operations of most firms.

In the past, it was not uncommon for a company to operate exclusively in one country or region. Globalization efforts were limited by the technology of the era; it cost excessive amounts of time and money to expand operations overseas, and as a result, global expansion was only feasible for large firms. However, today's technology solutions are not only more affordable, but also allow for a greater degree of visibility and control across all business segments. This is allowing companies to pursue their globalization strategies more efficiently and at a much lower cost than their historical counterparts. Due to this "democratization of technology," companies of all sizes are able to extend their reach beyond their country of origin and into entirely new world regions. In fact, as uncovered through a recent Strategic Treasurer survey, 83% of firms now operate in more than one country, 38% in 20 or more countries, and 20% in 41 or more countries. Furthermore, at least 30% of respondents to the same survey were operating in each of the 10 major world regions.

Although the opportunity to expand and grow their business worldwide is valuable to many firms, globalization does not come without its own set of challenges. Each new country a company enters has a unique set of regulations and compliance standards that must be adhered to. Entering new countries and regions may also mean that a company must add new banks, and subsequently new bank accounts, to support their operations. Furthermore, increased globalization tends to result in higher payment volumes as a firm's business grows. Finally, many firms involved in the acquisition of other companies find that each of their subsidiaries or new acquisitions are using different technology solutions, which can add to the complexity of the parent company's overall technology infrastructure. Subsequently, if a company's expansion efforts are not handled properly, the result can be a jumbled array of coexisting technology solutions, an unorganized, complex banking and payments structure, and an inability to effectively manage cash, protect against fraud, or ensure compliance with all applicable statutes.

Although the opportunity to expand and grow their business worldwide is valuable to many firms, globalization does not come without its own set of challenges.

Our Business Operates in This Many Countries:

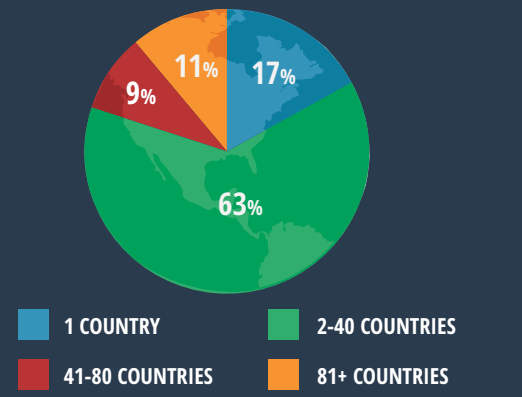


Figure 1

Our Business Operates in the Following Regions:

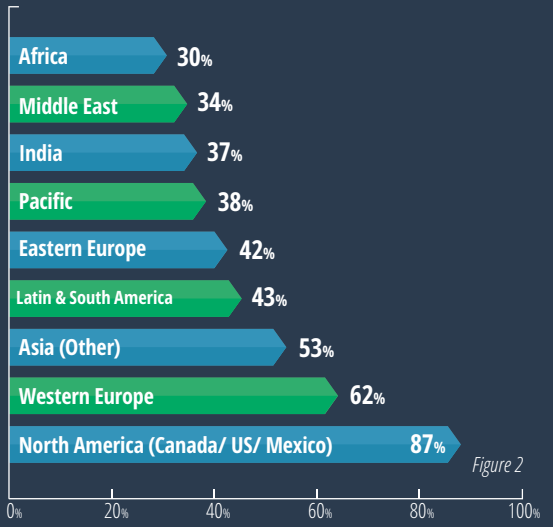


Figure 2

Figures 1 & 2: Based on a recent survey, 83% of organizations were operating in more than one country, and 20% were operating in 41+ countries. Additionally, at least 30% of organizations were operating in each of the major world regions.

INDUSTRY CHALLENGE: BANK & BANK ACCOUNT COMPLEXITY

At an organization's inception, it usually does not take more than a few Excel worksheets to keep track of company finances. Transaction volumes are low, and there are only a handful of banks and bank accounts through which activity must be tracked. However, as a business grows and expands, its banking structure tends to increase in complexity. New banks and bank accounts are added, which means that more bank relationships must be handled, and a greater spread of activity must be tracked and managed. These growing pains especially affect companies undergoing significant global expansion, as new bank partners and bank accounts must be added in regions where existing bank partners do not operate or have much expertise.

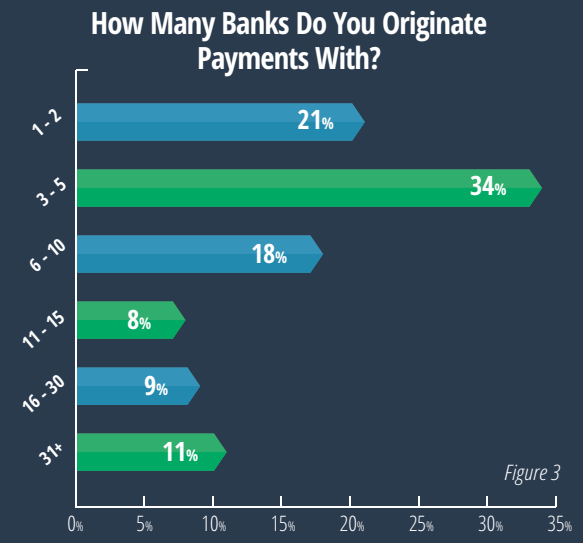
Within the past several years, continued global expansion has gone hand in hand with a rise in the number of banks and bank accounts that companies are using. According to a recent Strategic Treasurer Survey, 79% of firms were originating payments with three or more banks, while 45% used six or more banks, and 28% used eleven or more. Regarding individual bank accounts, 80% of firms had more than 25 accounts, and 54% had more than 100 accounts. At the top end of the spectrum, 24% had more than 500 accounts, and 15% had more than 1000.

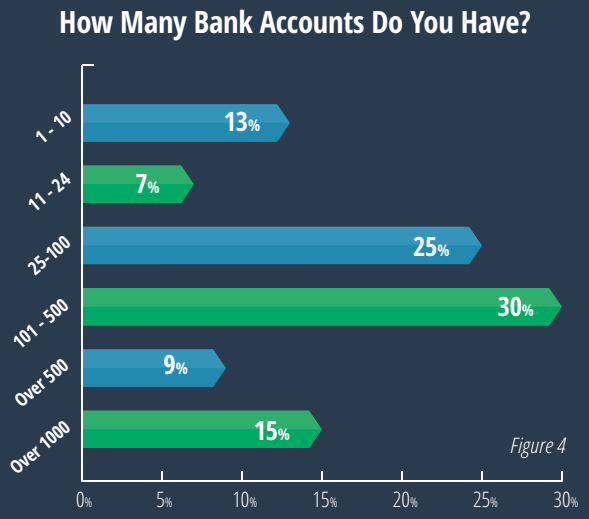
While international payment networks such as SWIFT and regional networks such as EBICS, NACHA, and Bacs have helped reduce the complexity that exists in the banking landscape, there is still a ways to go. There are a multitude of banks that are too small or isolated to be connected to any network, and thus must be connected to via a direct (H2H) connection. In other circumstances, the high volumes of payments a corporate generates through a particular bank may necessitate the use of a direct connection rather than connectivity via a network. Furthermore, there are a variety of other international and domestic bank networks through which different types of payments are sent, which means that corporates may have to manage connections to an array of individual banks in addition to multiple bank networks.

The high number of banks and bank accounts in use by companies today increases the burden placed on treasury in managing payment activity and maintaining control and visibility over cash. Organizations operating without a central payments system must often use multiple bank portals and solutions to view activity and download reports, and will then export this information into Excel or another platform for further analysis. This is a manual and error-prone process that increases in complexity every time a new bank or bank account is added. It also does not appear to be getting any easier, as over the course of the past year, 76% of firms have either maintained or added to the number of banks they use. As the complexity inherent in the banking structures of many companies continues to beleaguer treasury, the need for greater efficiency, visibility, and control across the banking landscape is higher than ever.

Organizations operating without a dedicated payments system must often use multiple bank portals to view activity and download reports, and then export this information into Excel or another platform for further analysis. This is a manual and error-prone process that increases in complexity every time a new bank or bank account is added.

Bank & Bank Account Complexity





Figures 3 & 4: In the current business environment, nearly half of all organizations originate payments with six or more banks, and 54% maintain more than 100 bank accounts globally.

Payments Intensity & Complexity

INDUSTRY CHALLENGE: PAYMENTS INTENSITY & COMPLEXITY

An additional layer of payments complexity for firms arises from the high volumes of payments that are being generated and the diverse set of channels and formats through which this activity originates. For instance, 50% of companies in a recent survey were generating more than 10,000 payments globally every month, while 35% were generating more than 100,000, and 24% were generating more than 1,000,000. While these high payment volumes are difficult enough to manage on their own, the added burden of having to account for multiple currencies creates even more strain. In the same survey, 79% of firms were generating payments using three or more currencies, 51% using six or more currencies, and 21% using sixteen or more.

To make matters worse, it is not just one type of payment format that companies are dealing with. Rather, there are multiple payment formats that come into play for various banks and through different bank networks. For example, the SWIFT banking network has long championed the use of the ISO 15022 standard (commonly referred to as SWIFT MT). However, the newer ISO 20022 (XML) messages are now seeing increased adoption, especially in Europe. Other common industry formats include BAI for reporting and EDI for payments. Furthermore, many banks have their own set of proprietary formats that are used for corresponding via a direct connection. Subsequently, for companies transacting with multiple banks through a variety of connectivity channels, adhering to the specific formatting standards of each bank can cause significant headache on the corporate end, as messages must be continually reformatted.

The final nail in the coffin for many treasury teams with regards to payments comes from attempting to maintain visibility and oversight over the payment operations of multiple departments and subsidiaries. While exercising control over payments that treasury originates on their own is easy enough, other departments such as payroll and AP also regularly generate their own payments, as do the various subsidiaries and branches of a company. These payments may occur through a separate payment system, which results in a delay of payment information reaching treasury. This subsequently impacts treasury's ability to manage liquidity and maintain visibility to cash, two vitally important functions that they are held responsible for.

The challenges that are confronted when dealing with a global, high volume, and multi-faceted payments landscape can obstruct treasury from focusing on more strategic activities, and can also make it more difficult to identify fraud and remain in compliance with the various regulations that exist across the payments landscape. Moving forward, treasury aggregators are poised to play a pivotal role in simplifying these complexities by aggregating payment information through a central portal and providing a single interface or system through which all payment activity can be tracked.

The challenges that are confronted when dealing with a global, high volume, and multi-faceted payments landscape can quickly consume all of treasury's time and obstruct them from focusing on more strategic activities.

What Is the Approximate Volume of Payments You Generate Globally Per Month?

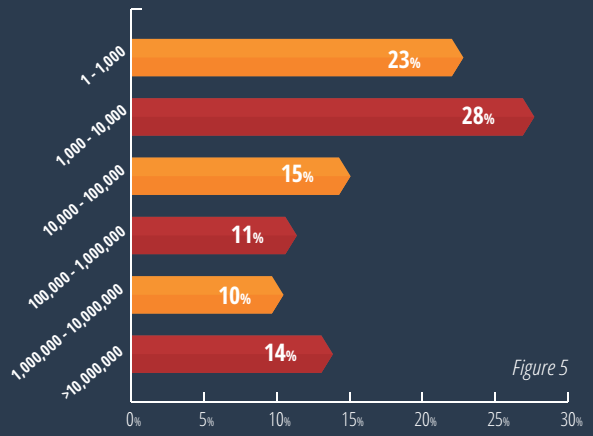


Figure 5

How Many Currencies Do You Regularly Make Payments In?

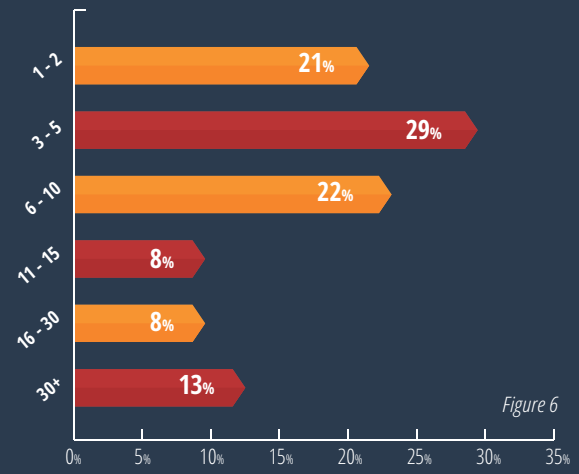


Figure 6

Figures 5 & 6: The payments complexity faced by treasury is amplified as organizations generate thousands and even millions of payments globally every month. These payments originate in a variety of currencies and through a number of unique payment channels.

INDUSTRY CHALLENGE: PROTECTING AGAINST FRAUD

While fraud prevention has always been an item on treasury's radar, its importance has escalated rapidly in recent years. This is due to both the large number of fraud attacks that are targeting the business environment and the high payouts that many criminals are achieving as a result.

In 2017, Strategic Treasurer's Treasury Fraud & Controls Survey found that 86% of companies had experienced fraud attacks within the past two years. This fraud activity was perpetrated through multiple channels, with 79% of firms experiencing Business Email Compromise (BEC) or imposter fraud, 65% payment fraud, 47% cyber fraud, and 8% ransomware.

Fraud is more than just an inconvenience; it is a massive threat that is consistently experienced by the majority of organizations in existence today.

While some of these fraud attempts were successfully thwarted, other companies suffered substantial losses. With regards to BEC fraud, approximately 1 in 7 firms that were targeted suffered a loss. Regarding check fraud, attempts were successful 10% of the time for check forgery and 1 out of every 8 times for check conversion. In other payments-related areas, schemes such as ACH fraud resulted in loss for 1 in every 8 firms targeted, and wire fraud for 1 in every 4 firms targeted. Furthermore, while the average losses stemming from check fraud in 2016 was $1500, BEC and wire fraud losses were closer to $130,000 per successful attempt, and average losses for more serious system-level fraud attempts were over $1 million. These figures give credence to the fact that fraud is more than just an inconvenience; it is a massive threat that is consistently experienced by the majority of organizations in existence today.

In today's business environment, criminals are actively looking to infiltrate every layer of an organization's security. As a result of this activity, many firms' payment processes have come under intense scrutiny, especially as criminals introduce increasingly sophisticated methods of perpetrating fraud. The sophistication of these methods has been on full display over the past year, with the WannaCry ransomware attacks receiving global media coverage, and the recent Bank of Bangladesh heist garnering worldwide attention as well. Due to the heightened threat that fraud continues to pose, payment security has rapidly climbed treasury's priority list to the extent that, in a recent survey, fraud prevention was listed as a top payment priority by over two-thirds of treasury and finance teams. Additionally, as part of the 2017 B2B & WCM Strategies Survey, 61% of firms indicated that security concerns had a strong or very strong influence on their technology spend, and 46% of firms had higher or significantly higher payment security concerns than in previous years, compared to just 2% with lower security concerns. Given these developments, it is clear that there is an immense market need for robust payment security tools and fraud prevention technology.

Due to the heightened threat that fraud continues to pose, payment security has rapidly climbed treasury's priority list to the extent that, in a recent survey, fraud prevention was listed as a top payment priority for over two-thirds of treasury and finance teams.

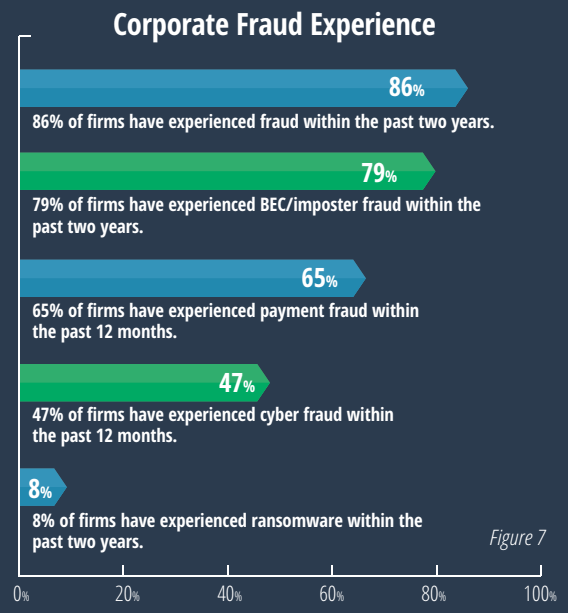


Figure 7

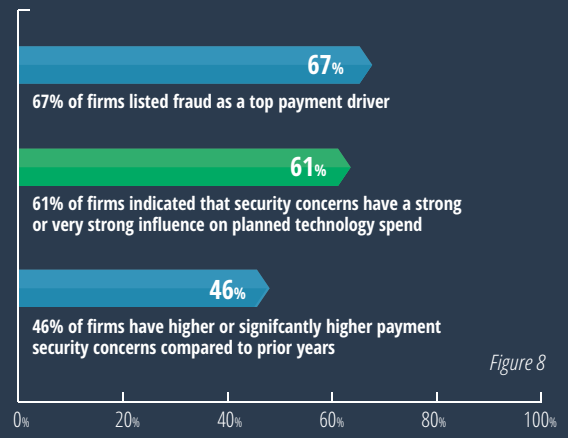


Figure 8

Figures 7 & 8: As fraud continues to ravage the corporate landscape, the security concerns that organizations have regarding their payment operations are prompting many to invest heavily in treasury security and fraud prevention technology.

Heightened Compliance Expectations

INDUSTRY CHALLENGE: HEIGHTENED COMPLIANCE EXPECTATIONS

At the same time that fraud concerns are causing an industry pandemic, the business environment is also being heavily impacted by escalating compliance expectations. Events such as the 2001 terrorist attacks and subsequent terrorist and criminal activity, as well as the 2008 financial collapse and resulting market volatility, have resulted in a number of new regulatory measures being implemented across the corporate and banking landscape. Regulatory bodies such as the Office of Foreign Assets and Control (OFAC) and the Financial Crimes Enforcement Network (FinCEN) have been created to target criminal and terrorist networks, and focus their aim on ensuring that companies are not funding known criminal organizations. This is done through the provision of a list of sanctioned parties and individuals that organizations are forbidden from conducting business with. Additionally, as a means of cracking down on tax evasion, the United States introduced mandatory Foreign Bank Account Report (FBAR) filings for companies and individuals with more than $10,000 held in overseas accounts. These filings have caused widespread confusion and headache for organizations in North America, as they now must annually track and report on a large spread of information regarding their foreign account holdings.

In order to ensure adherence to these statutes, the governing bodies overseeing these regulations have placed severe penalties on organizations that fail to comply. In fact, when looking at sanctions violations over the past four years, nearly $1.95 billion worth of penalties and fines have been assessed by OFAC. While some might think that the brunt of these penalties are levied towards banks, recent changes to legislation have made it so that whatever party is found to be most negligent regarding a sanctions violation is the party that suffers a penalty. Thus, for the 35% of corporates in a recent survey that were found to not be conducting any sanctions screening, there is a heightened risk of being found at fault in a compliance violation. In fact, the 2016 Treasury Fraud & Controls Survey found that 12% of firms had either made or received a payment from a sanctioned party within the past year. In 2017, 6% of firms made similar mistakes.

The consequences of being found in violation of compliance standards are twofold. For one, it damages the reputation of the company and can hurt business as potential clients and investors look to avoid any fallout associated with the violation. The other consequence is the fine or penalty levied against the organization. Over the last year, individual penalties assessed against organizations or individuals by OFAC ranged from $10,000 all the way up to $100,000,000 (OFAC). Where FBAR is concerned, violations can be penalized by $100,000 or half the value of the perpetrator's overseas holdings, whichever is greater. Thus, as the compliance environment continues to develop, the challenge of adhering to all relevant regulations and sanctions requirements is an issue that organizations must address.

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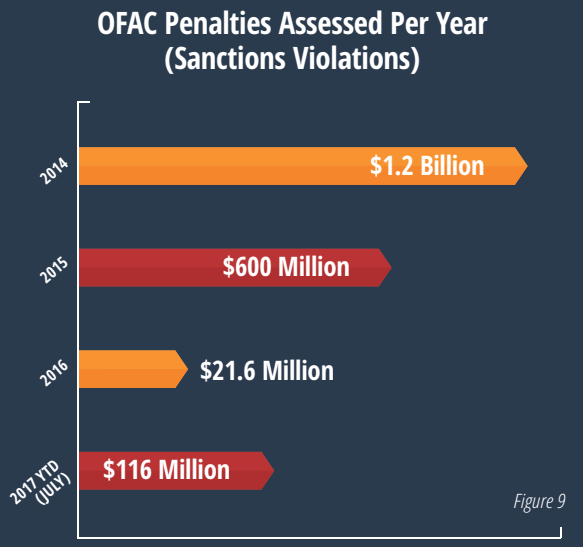
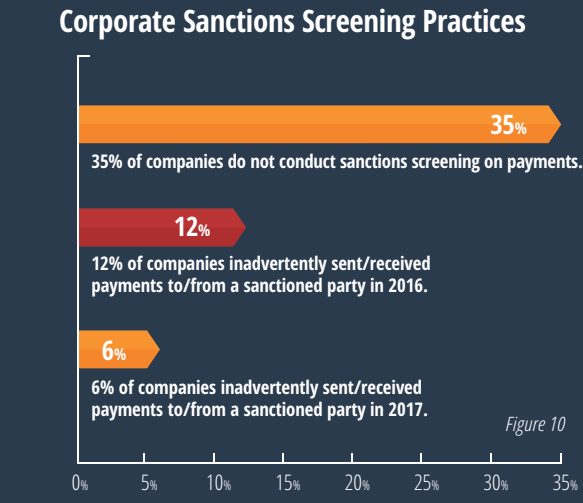




Figures 9 & 10: As regulatory bodies like OFAC and FinCEN put compliance practices under heavy scrutiny, the pressure is on for organizations to ensure their compliance with relevant sanctions and reporting requirements.

INDUSTRY CHALLENGE: UNDERSTAFFED TREASURY TEAMS

If every treasury team consisted of a dozen or so employees, perhaps there would be enough manpower to appropriately distribute all the tasks treasury must perform without the need for improved technological efficiency. However, this is wishful thinking for most treasury teams. In reality, 73% of global treasury organizations consist of 10 or fewer employees, and 51% consist of 6 or less employees. For almost two-fifths (39%) of treasury teams, the total staff size is 3 or fewer.

Across a large swath of the corporate landscape, treasury teams are being kept lean. At the same time, the responsibilities that treasury is tasked with have continued to increase.

Across a large swath of the corporate landscape, treasury teams are being kept lean. At the same time, the responsibilities that treasury is tasked with have continued to increase. The modern-day treasurer has a large stake in financial processes ranging from cash forecasting and visibility to FX trading, risk management, liquidity and working capital management, fraud prevention, bank account management, and payment management. For treasury teams consisting of only a few employees, attempting to manage operations across all these fronts simultaneously is incredibly difficult.

As the inverse relationship between treasury's responsibilities and the size of their team persists, most departments have no option but to increase efficiency wherever possible. To ensure they have time to perform the more strategic roles they are entrusted with, treasury teams are looking to streamline and automate many of the daily tasks and processes they must perform. For many teams, payments represent an area where increased automation and Straight-Through-Processing (STP) would free up large amounts of time and also result in significant cost-savings opportunities. This is particularly true for organizations that are using heavily manual payment processes.

As organizations look to streamline their operations, it is no surprise that efficiency was ranked as the 2nd most important payments driver for treasury, behind only fraud management. With regards to this efficiency, 79% of corporate respondents saw value in making changes to their payment operations in order to reduce internal costs, 62% to reduce errors, and 59% to reduce external costs.

As the need for increased efficiency and control continues to be a top priority for treasury, technology is poised to play a huge role. For thinly staffed companies making hundreds or thousands of payments every day, manual payment processes are simply not an option. Instead, in the 2017 B2B & WCM Strategies Survey, five times more companies were planning to spend more on payments technology in the coming year than those planning to spend less. Regarding this spend, 50% of firms intended to invest more than $50,000, with 28% planning to spend more than $250,000, and 8% over $1 million.

As the need for increased efficiency and control continues to be a top priority for treasury, technology is poised to play a huge role.

How Large Is Your Global Treasury Organization, Including Analysts?

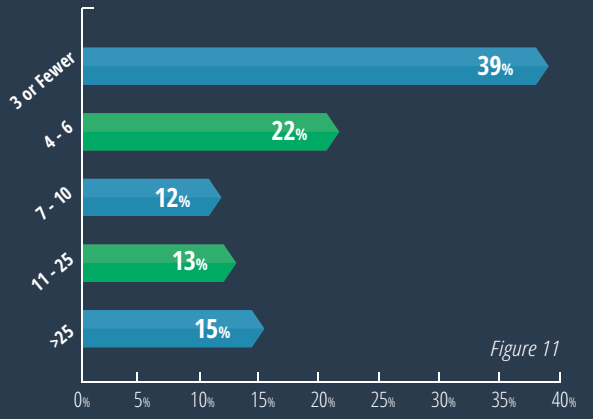


Figure 11

How Much Does Your Company Plan to Spend on Payment Technology In the Next Year?

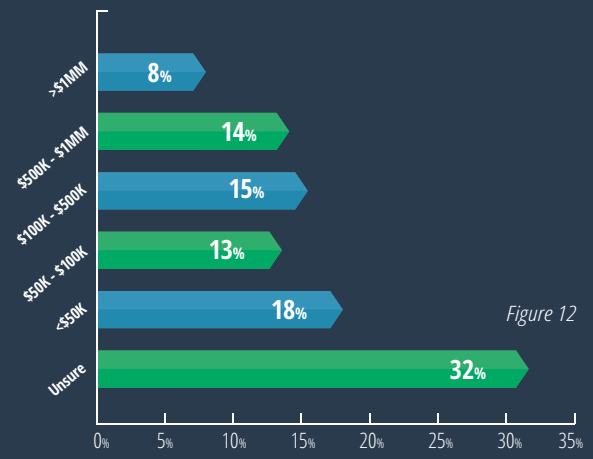


Figure 12

Figures 11 & 12: While the responsibilities delegated to treasury continue to increase, the staff sizes for many treasury departments have been kept lean. This is forcing many treasury teams to rely heavily on technology for automating and streamlining as many tasks as possible to achieve greater efficiency.

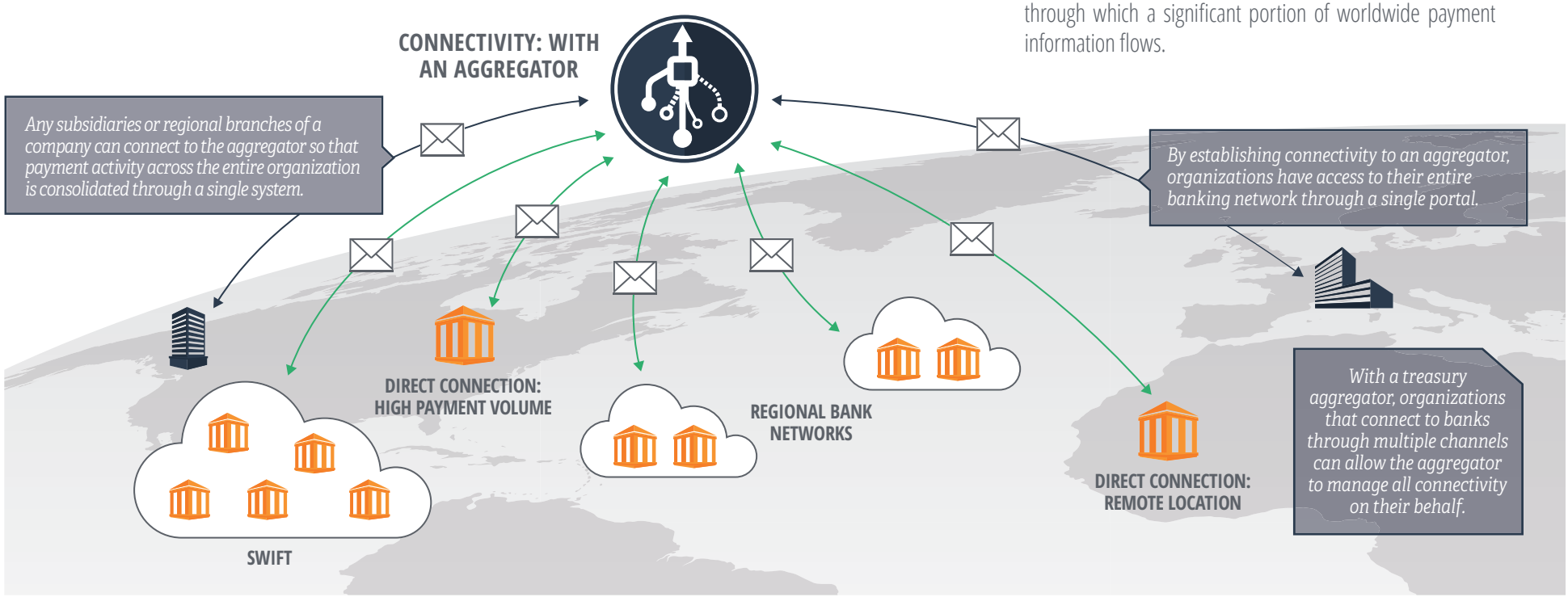
Simplified Global Bank Connectivity

WHAT BENEFITS DO TREASURY AGGREGATORS PROVIDE?

AGGREGATOR BENEFIT: SIMPLIFIED GLOBAL BANK CONNECTIVITY

Treasury aggregators specialize in bank connectivity. Resultantly, the benefits and advantages that are derived through the use of an aggregator stem primarily from the provision of these connectivity services. While practically any firm can benefit from the functionality offered by treasury aggregators, those companies dealing with heightened global complexity and a diverse set of bank relationships would find the functionality most valuable. The connectivity services offered by treasury aggregators can be broken down into three distinct categories:

⊞ **SWIFT Services:** Treasury aggregators are capable of connecting corporates to SWIFT via SCORE, and most will function as fully operational SWIFT Service Bureaus. This means that corporates have the option of using both SWIFT FIN and FileAct services directly through the treasury aggregator, and in some circumstances, they may even have access to the aggregator's Bank Identification Code (BIC), instead of having to purchase their own. As all treasury aggregators have established connectivity to SWIFT, a corporate client can be confident that any banking partner that uses SWIFT will be accessible through the aggregator. For many corporates, accessing the SWIFT network provides them with connectivity to the majority of their banking partners and is the channel through which a significant portion of worldwide payment information flows.



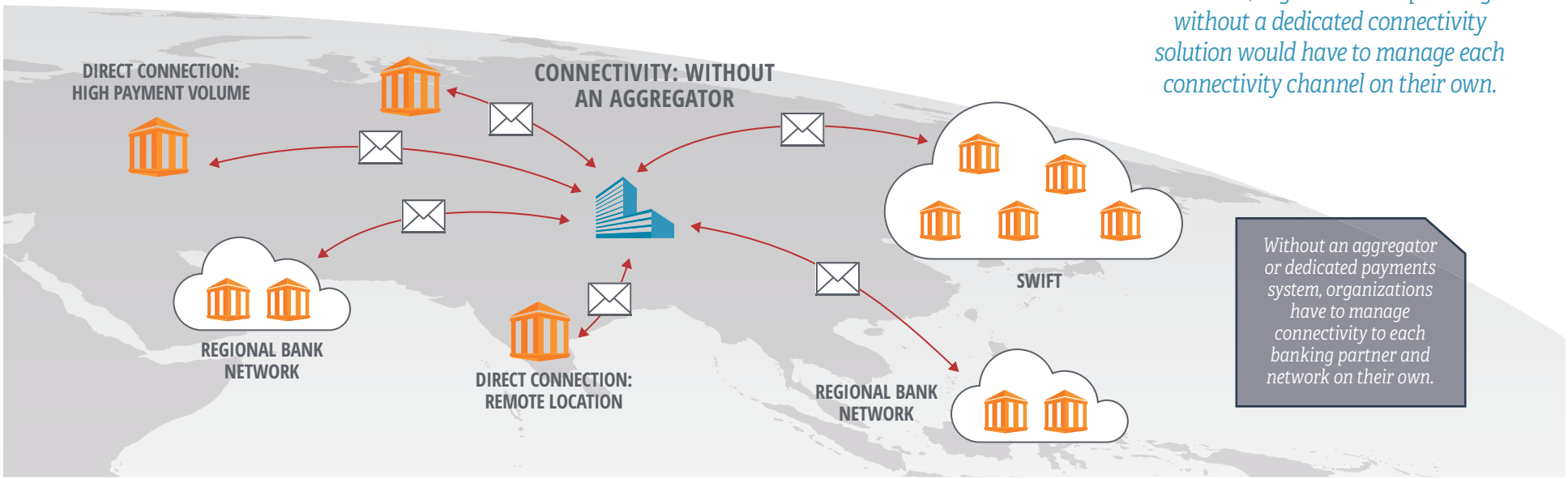
Simplified Global Bank Connectivity

⊞ **Direct Connections:** Although more than 11,000 financial institutions in 200+ countries utilize SWIFT, there are still large numbers of banks that are not connected to SWIFT or any other network. Additionally, some corporates maintain such high volumes of payment activity with their core banks that it makes more sense to connect directly to the bank's system rather than going through a network. In these circumstances, individual (H2H) connections have to be established between the corporate and the bank. Treasury aggregators simplify this process by handling each direct connection a corporate requires and routing all bank information and activity through their system to the corporate's TMS or ERP. Although many aggregators have already established a large number of direct connections to individual banks, they can establish additional connections to any bank a client requires.

⊞ **Regional/Alternate Networks:** Beyond SWIFT, there are a number of other payment networks that corporates may use to interact with their banks. For domestic payments, wires can be routed through regional networks such as NACHA in the USA, Bacs in the UK, and Zengin in Japan. Other examples of alternate payment networks include the use of Fedwire and CHIPS in North America, and EBICS as an alternative to SWIFT that is used by some organizations in Europe. Treasury aggregators are capable of connecting to each of these regional networks and to virtually any other established network in existence. For any payment exchanged through their system, treasury aggregators ensure that the payment details meet all relevant formatting and standardization protocols, such as the SEPA standards that apply in the Eurozone.

In today's world, most corporates interact with their banks through a combination of the aforementioned methods. As such, treasury aggregators play an important role in centralizing, streamlining, and simplifying the bank connectivity process. The provision of a single system for managing all bank interactions is advantageous because corporates only have to maintain one connection to the treasury aggregator and can then allow the aggregator to manage all subsequent support and maintenance tasks.

The provision of a single system for managing bank connectivity is advantageous because corporates only have to maintain one connection to the treasury aggregator. In contrast, organizations operating without a dedicated connectivity solution would have to manage each connectivity channel on their own.



Streamlined Payments & Reporting

AGGREGATOR BENEFIT: STREAMLINED PAYMENTS & REPORTING

Once all a corporate's banks have been onboarded to an aggregator, the result is a streamlined payments and reporting workflow that requires minimal levels of manual intervention. Treasury aggregators cover the electronic funds transfer (EFT) process, beginning with file origination and including steps such as message formatting, sanctions screening, and data validation all the way through to delivery and confirmation. Payments from any of a company's subsidiaries and departments, including treasury, AP, and HR, can be funneled through the aggregator's system for delivery to banks. Aggregators are capable of handling the full suite of ACH and wire activity generated by the various departments of an organization, including both high value, low volume payments typically conducted by treasury and also low value, high volume payments generated by other departments. For treasury, the majority of payment activity is conducted via wires or ACH, and includes FX trades, investment activity, debt payments, and hedging activity. For other departments like AP and HR, the majority of activity involves payments made to vendors and employees, either through wires, ACH, or electronic checks. In either case, treasury aggregators can manage this payment activity, including the various payment methods, and can account for each of the various banks and bank formats that a specific department might use.

Treasury aggregators cover the electronic funds transfer (EFT) process from message formatting, sanctions screening, and data validation, all the way through to delivery. Payments from any department, including treasury, AP, and payroll, can be funneled through the aggregator's system for delivery to banks.

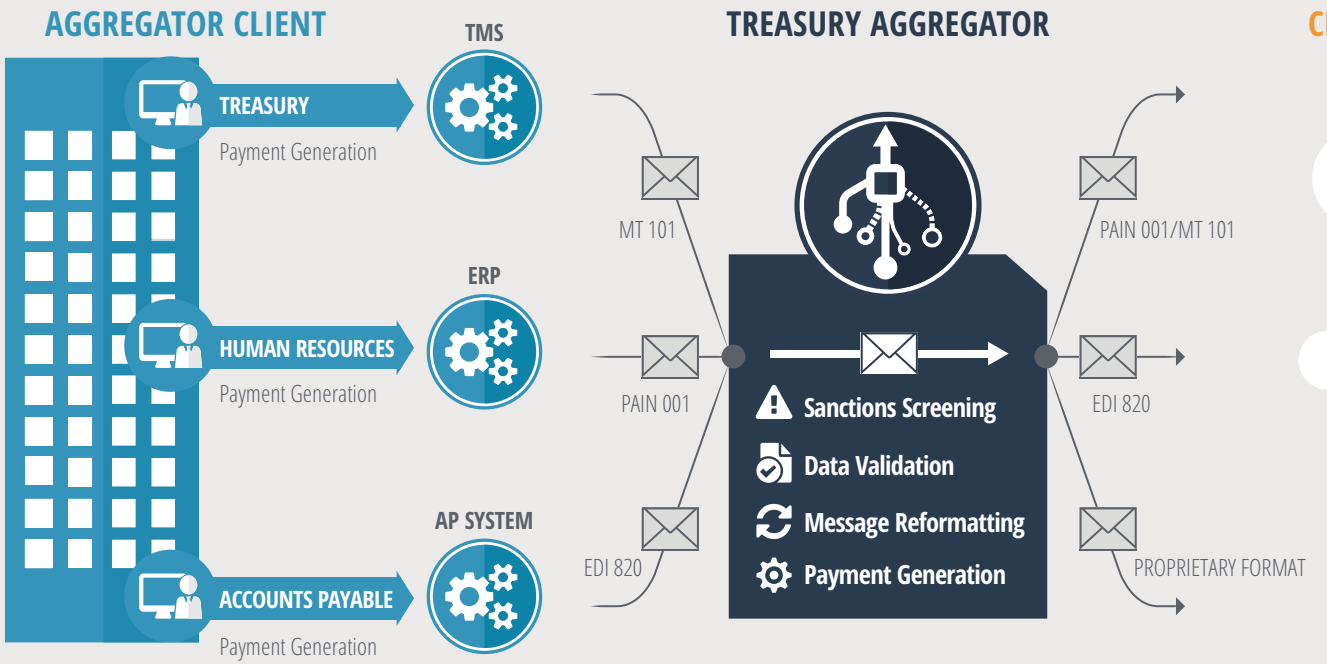
Authorized users can generate payments directly through the aggregator's portal at any time. Most aggregators allow for custom payment workflows to be designed by each client for initiation and approval, and offer the ability for payments to be generated via standard templates, as custom entries, or to flow from an ERP or TMS. For firms originating payments through another treasury solution, the payments tasks typically managed by an aggregator begin once a payment has already been created and approved. At this point, the payment instructions flow directly from the originating internal system (TMS, AP, ERP, etc.) to the aggregator's system. These instructions commonly have to be transformed from their original format into a standard that is accepted by the recipient bank. Depending on the location of the bank and also the bank's size and sophistication, the message formats that are accepted can differ widely. However, a treasury aggregator is capable of handling any message reformatting on behalf of their clients, and can support a number of different formats including EDI/BAI, SWIFT MT, and XML-based ISO 20022. Aggregators also maintain a library of proprietary standards commonly used by individual banks for direct connections. Maintaining compatibility with each "messaging standard" is pivotal for aggregators, as it ensures that clients will never run into issues regarding an unsupported format.

Once the formatting process is complete, aggregators will run sanctions screening and data validation checks on each message before ultimately sending the instructions to the recipient bank. If any message is found to be non-compliant or to contain formatting anomalies, aggregators will halt the payment, send it to a resolutions queue, and notify the client that the payment details need to be reexamined before the message can be sent.

On the reporting side, treasury aggregators can direct messages received from banks, such as bank statements and transaction activity, back to the corresponding corporate system and end user. This process works similarly to how payments are sent and received. The bank sends a statement or report to the treasury aggregator, who then validates the contents and reformats the message into a standard accepted by the corporate's internal systems. For clients who request it, aggregators can export bank statements into formats such as Excel and PDF to make for easier reporting. Reports and statements can also be directly exported into a TMS or ERP. If the corporate isn't using a TMS or ERP system, they can log in to the aggregator's portal to view bank statements and activity. As a significant portion of clients routinely access their aggregator's portal for this purpose, many vendors have developed a robust set of interfaces for displaying cash balances and payment activity.

On the reporting side, treasury aggregators can direct messages received from banks, such as bank statements and transaction activity, back to the corresponding corporate system and end user.

Streamlined Payments & Reporting



1

Any department within an organization and any subsidiary of the parent company is able to generate and send payments using a treasury aggregator. Payments from any internal systems, including a TMS, ERP, or AP system, can be set up to pass through the aggregator on their way to banks.

For organizations without a TMS or ERP, the aggregator's system can be used for generating payments, viewing bank statements and activity, and maintaining visibility to cash positions.

2

Once an aggregator receives payment instructions, it performs both sanctions screening and data validation checks to ensure the validity and compliance of each message. If a message passes these checks, the aggregator converts the message into a format accepted by the recipient bank.

While treasury aggregators can facilitate the exchange of payments that are generated in other systems, clients can also use the aggregator's portal to initiate payments.

3

A treasury aggregator maintains connectivity to a number of bank channels, including SWIFT, alternate networks, and direct connections. For each payment generated by a client, the aggregator routes the message down the necessary channel and to the appropriate bank.

Once a payment has been delivered to a bank, any bank statements or reports are downloaded by the aggregator and made available either directly through the aggregator's portal or via the client's other internal systems (e.g. TMS, ERP, etc.).

Cash Management & Visibility

AGGREGATOR BENEFIT: CASH MANAGEMENT & VISIBILITY

As part of Strategic Treasurer's 2017 Treasury Technology Use Survey, respondents were asked to identify which functions they regularly used or needed in treasury. The resulting data found that the most needed and regularly used functionality was cash positioning, with 86% of respondents using it. In most treasury organizations, maintaining visibility to cash and cash positions is a daily responsibility that requires constant oversight. For organizations that maintain multiple bank relationships and dozens or even hundreds of bank accounts, this process can become quite complex. This is especially true given the fact that nearly half of all organizations in a recent survey were generating more than 10,000 payments globally every month, much of which is occurring in different countries and via a range of currencies.

For companies operating without any sophisticated treasury solution, the process of maintaining visibility to cash would require the use of multiple proprietary bank portals to view transaction activity, and the exportation of this information into Excel spreadsheets for further analysis and upkeep. Although this process might be manageable for a few bank accounts, it is far from ideal for companies with hundreds or thousands of accounts worldwide. Additionally, for firms with multiple subsidiaries, receiving payment activity from these branches without a sophisticated connectivity solution is often delayed, which makes it practically impossible to achieve consistent visibility to all cash positions. Thus, for most firms, additional efficiency beyond these manual workflows is a necessity if greater control is to be realized.

In most treasury organizations, maintaining visibility to cash and cash positions is a daily responsibility that requires constant oversight. For organizations that maintain multiple bank relationships and dozens or even hundreds of bank accounts, this process can become quite complex. This is especially true given that many organizations generate thousands or even millions of payments every month.

As a treasury aggregator is capable of handling all payment and reporting activity for an organization, a primary benefit for treasury is increased visibility and control over cash. This advantage is provided by aggregators through direct management of all incoming and outgoing payment activity for an organization because the treasury aggregator is connected to all banks and bank accounts in use by the client. As an organization's payment activity passes through the aggregator, changes that occur in any of the client's bank accounts are registered in the aggregator's system. With this holistic view of payment activity, an aggregator is able to maintain updated cash positions and provide cash views either directly through their portal or through the client's other systems.

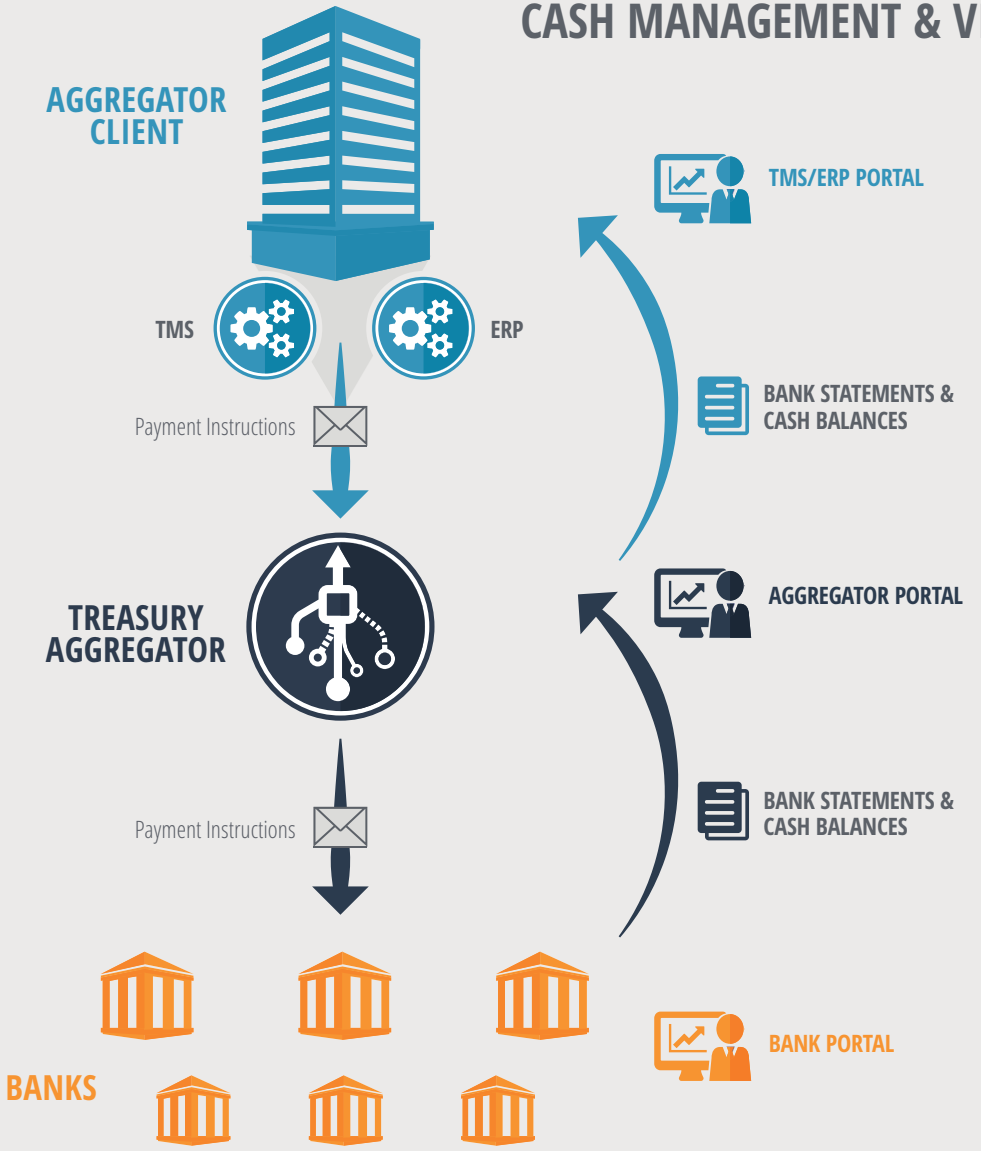
For organizations using a TMS or ERP, payments and reporting activity that is managed by the aggregator passes into these systems for purposes of updating cash management modules. This makes treasury's task of maintaining visibility to cash balances and positions much easier, as little to no manual intervention is required. Most aggregators regularly work with a number of ERP and TMS providers, which makes the Straight-Through-Processing (STP) of information a simple process and one that can be set up with little difficulty. The end result for the company as a whole is that payment activity can be routed through the aggregator to provide treasury with a holistic view of cash balances and enhanced visibility and oversight to company-wide cash flows.

For companies not using a TMS or other treasury solution, an aggregator can fill the void by providing views of cash positions in their own system. Many aggregators have established interfaces that work similar to a TMS or ERP in that payment activity can be analyzed and managed through a set of interfaces. Some aggregators have extended the capabilities of their interfaces to contain dashboards that display cash positions and balances by country, currency, bank, and other metrics. For aggregators that also function as a TMS, payment activity can be routed into the other modules of their solution so that a single instance of data is used throughout the system, which reduces the chance of error or duplicate information. For instance, a payment conducted through the system in the payments module would automatically update the cash positioning module to reflect any changes in cash balances, and it would also update the G/L in the accounting module.

As a treasury aggregator is capable of handling all payments and reporting activity for an organization, a primary benefit for treasury is increased visibility and control over cash.

Cash Management & Visibility

CASH MANAGEMENT & VISIBILITY



1

For organizations that use a TMS or ERP, bank activity and cash balances that pass through the aggregator can be routed to these systems for viewing and analysis. This ensures that clients do not have to access both the aggregator's portal and the TMS/ERP to achieve visibility.

2

Most treasury aggregators provide access to a portal where cash balances and reports for all payment activity conducted through their system can be viewed. This provides treasury with a central view of their cash positions.

3

Many of an organization's bank partners typically provide access to a proprietary bank portal where cash balances and activity can be viewed. However, those operating with multiple bank relationships would have to use multiple portals to obtain a holistic view of cash positions.

Enhanced Security Features

AGGREGATOR BENEFIT: ENHANCED SECURITY FEATURES

One of the most crucial services a treasury aggregator provides is in the area of fraud protection. As year-over-year rises in fraudulent activity have become the norm, corporates are growing increasingly unsettled regarding the security of their payment operations and are wary of third-party providers who aid in the process, as these external systems are seen as potential exposure points. In fact, the 2017 Treasury Fraud & Controls Survey found that 78% of firms saw payments processing as posing a cyber threat risk to their organization. Additionally, third-party relationships posed a risk for 52% of organizations, and outsourced services, such as a TMS or SaaS-based fintech solution, were viewed as a risk by 24%. While these fears are natural given the current fraud environment, treasury aggregators have taken an active stake in fraud prevention and security by building out a variety of security layers that cover virtually every step within the payments cycle. This includes information being exchanged both internally and externally, as well as information at rest.

As year-over-year rises in fraudulent activity have become the norm, corporates are growing increasingly unsettled regarding the security of their payment operations and are wary of third-party providers who aid in the process, as these external systems are seen as potential exposure points.

The protection offered by aggregators for their clients begins with securing access to the portal itself. As a means of limiting entry into their system, many vendors utilize IP filtering support that restricts access to the server from unauthorized IP addresses, so that only those addresses registered to the client are able to gain entry. Next, for users that must log into the aggregator's portal, screen entry security or the use of digital keyboards prevents keystroke capture as usernames and passwords are entered. In other circumstances, the use of a token, such as a key fob or USB drive, is required for users signing into the system so that, in the case that passwords and usernames are stolen, criminals would still not be able to gain entry. This style of security where a combination of security techniques are used in conjunction with one another has become a popular approach. As part of these dual or multi-factor authentication approaches, any user attempting to log into the aggregator's portal must submit two or more forms of ID, such as a username/password combination and a key fob, before access is granted.

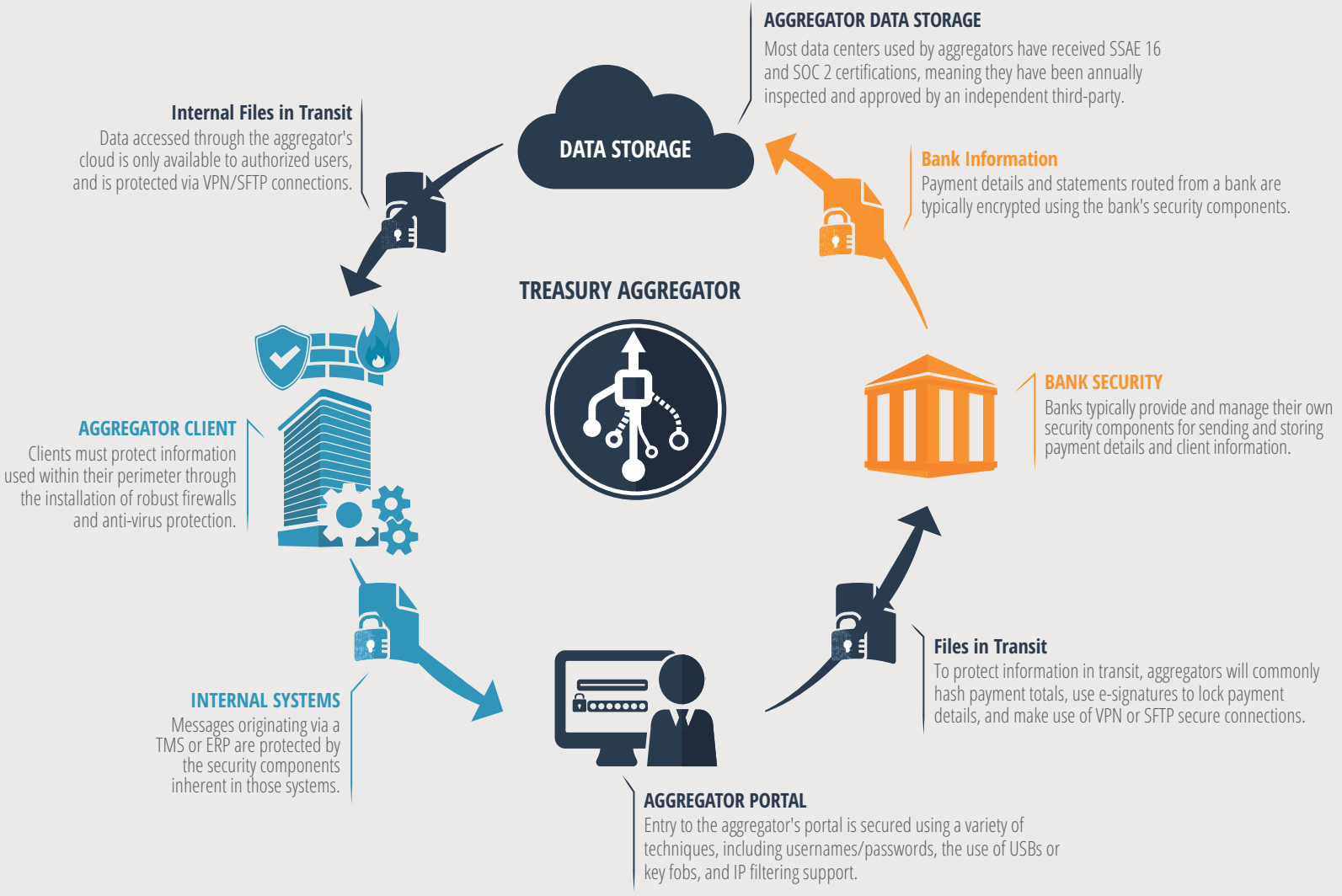
The next area in which aggregators provide security and protection is for files passing through their system, such as payment details and client information. For information in transit, most aggregators will hash totals on payment information as a method of identifying any anomalous changes to values or account numbers that occur en route to banks. Aggregators also typically require e-signatures on payments from authorized users, and will "lock" a file after it has been signed. Using this technique, alerts will be sent to employees if a message is altered in any way after a signature has locked it. System settings can also be formatted so that all payments or payments over a certain amount require dual signatures before being processed and delivered (e.g. all payments over $25,000 require two signatures). Also, as a general standard, all information that passes through an aggregator's system is encrypted, usually via an SSH File Transfer Protocol (SFTP) connection. For additional privacy, many aggregators will funnel SFTP traffic through a virtual private network (VPN) so that information exchanged between various company locations and subsidiaries is kept as secure as possible.

Regarding the security of information at rest and stored on an aggregator's server, there are a number of specific certifications or "standards" that come into play. Each standard represents a specific level of security coverage and a unique set of components that are used for data protection. These standards include SAS-70, SSAE 16, and most recently SSAE 18 certifications. The leading practices for security in data centers currently are the SSAE 18 (SOC 1 and SOC 2) certifications. In order to obtain SSAE certification, a company must have their data centers annually inspected and approved by an independent and professional third-party. Obtaining SOC 2 certification means that the controls used at the data center provide reliable system security, integrity, and privacy.

Treasury aggregators have built out a variety of security layers that cover virtually every step within the payments cycle. This includes restricting access into their system to authorized users and providing secure connectivity channels for information being exchanged or hosted through their server.

Enhanced Security Features

SECURITY FRAMEWORK: TREASURY AGGREGATORS



Enhanced Compliance Features

AGGREGATOR BENEFIT: ENHANCED COMPLIANCE FEATURES

Just as aggregators provide security and protection against fraud, they also work to ensure the compliance of all a client's payment activity with sanctions and regulatory requirements. Historically, the vast majority of all compliance-related responsibilities fell to banks. While banks continue to be burdened with an ever-growing list of regulatory requirements, the introduction of new regulation by governing bodies, particularly FinCEN and OFAC in North America, has resulted in heightened compliance expectations for corporates as well. Due to these regulations, corporates must now track a large set of bank-related data for purposes of filing FBARs and fulfilling other documentation requirement. At the same time, there is now a heightened responsibility placed on corporates for screening their payment activity against sanctions lists to ensure that business is not conducted with known terrorist or criminal groups. These lists cover thousands of individual names, aliases, and businesses, and are in a constant state of change as sanctions programs evolve. For instance, recent changes to the list saw new sanctions imposed against Iran, Cuba, and Russia for various infringements, and also additions to the list of Specially Designated Nationals (SDNs) who are known terrorists or criminals.

The introduction of new regulation by governing bodies, particularly FinCEN and OFAC in North America, has resulted in increased compliance expectations for corporates.

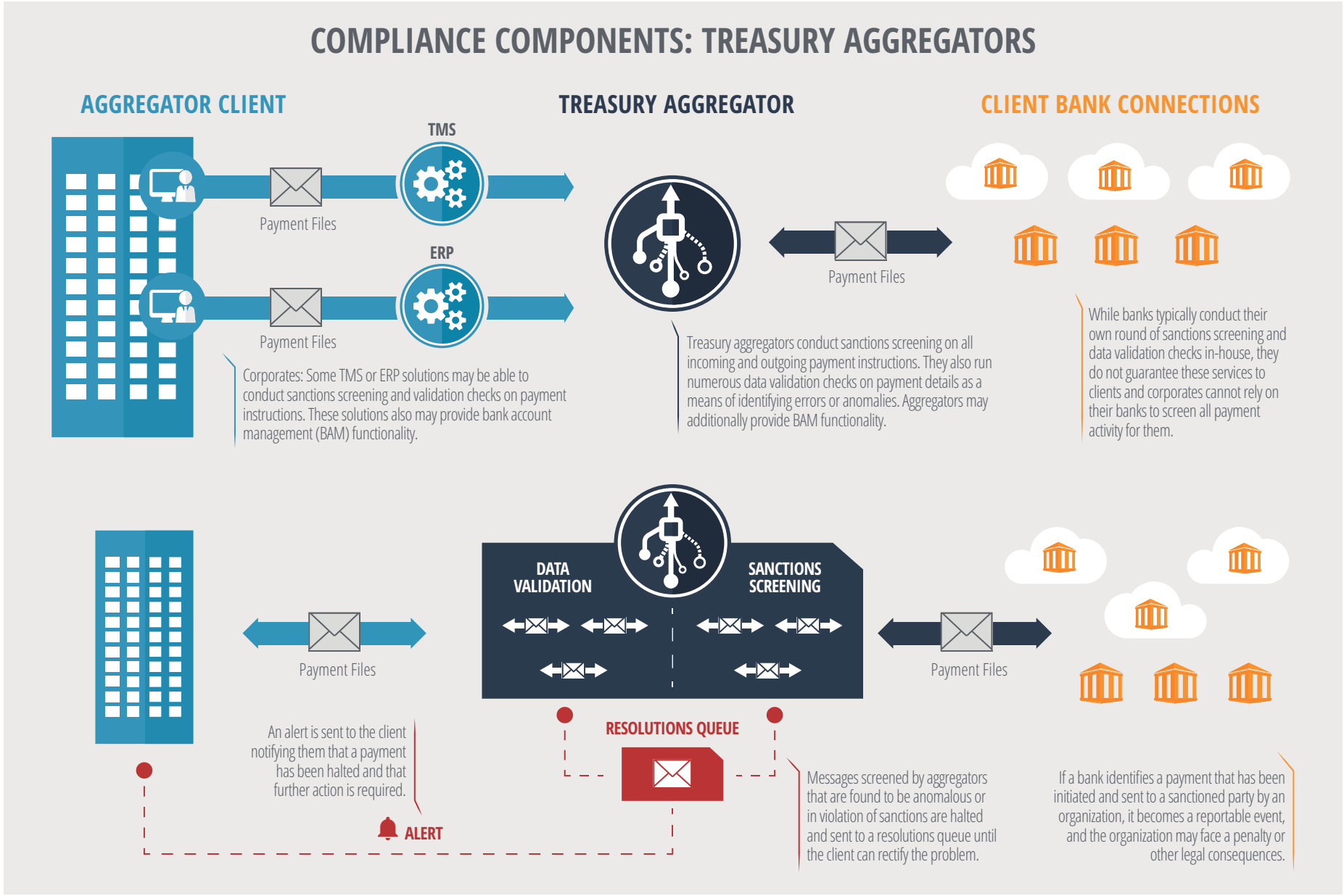
The penalties for violating a sanctions arrangement are quite severe if a corporate is found to be negligible, with fines against a single company having ranged up to $100 million in the past year. Where FBAR is concerned, violations for organizations failing to report on their foreign bank accounts can be penalized by either $100,000 or half the value of the account, whichever is greater. In order for organizations to avoid these penalties, the only option is to comply with sanctions requirements and to annually report their foreign bank account activity per FBAR. Understandably, for organizations with hundreds or thousands of foreign bank accounts and those that send numerous payments every day, ensuring compliance with all known requirements can be costly and time consuming.

Having a system that can screen hundreds, thousands, or even millions of payments against all relevant sanctions lists while also keeping track of all pertinent bank account information is a momentous advantage for companies.

To protect their clients from sanctions violations and penalties, aggregators screen all payment activity conducted through their system against relevant sanctions lists. They can also run a number of validation checks on messages to ensure that the formatting is correct and that there are no anomalies. The standard protocol for a message that does not pass these checks would be to halt its progress in the payments cycle and send it to a resolutions queue. The aggregator would then notify a list of authorized users that a message has been flagged and provide details as to why the message was stopped (e.g. missing line item, suspicious recipient, etc.). These users could then log into the aggregator's system to analyze the problem, make any necessary changes, and resend the message. This process is helpful both for ensuring that payment activity remains compliant with sanctions lists and also for protecting against fraud, as an unapproved or "suspicious" payment has a greater chance of being identified through the data validation process of an aggregator than by the corporate acting alone. Examples of validation checks conducted by aggregators include duplicate message checks, delivery date checks, and unexpected fields or "empty" message checks. As an additional means of ensuring accuracy, aggregators will compare opening account balances and closing balances against all known payment activity, and will alert an organization if the balances don't add up. This process aids in identifying unauthorized or anomalous payments, in addition to any payments that have been delayed or halted throughout the day.

With regards to bank account management, some aggregators have dedicated BAM modules that allow users to open and close bank accounts, handle the administration of account signatories, and track account information for purposes of FBAR filing. Some may even take this a step further by providing bank performance analysis and relationship management features directly within their portal so that statements and fees between banks can be compared and analyzed. However, aggregators can also set this information up to flow into a TMS or ERP, such that companies with an already-established BAM module can manage bank activity without having to use two separate platforms.

Enhanced Compliance Features



Technological Benefits

AGGREGATOR BENEFIT: TECHNOLOGICAL BENEFITS

Although each of the previously discussed benefits are shaped by technology, it is important to touch on the advantages that stem solely from the adoption of a sophisticated technology solution, such as the increased automation of tasks, centralization of data, and enhanced Straight-Through-Processing (STP) of information passing through multiple systems. Furthermore, the provision of expanded functionality offered by some aggregators can be beneficial for corporates that do not already have a sophisticated treasury solution, as functionalities including FX trading, debt, investments, and accounting could be implemented to provide additional support beyond what is associated with bank connectivity.

⊞ **Automation:** A treasury aggregator can alleviate the strain placed on treasury and other departments by carrying out many of the payments-related tasks that have traditionally been performed manually. Rather than an employee repeatedly entering in payments, custom workflows can be configured once for specific types of payments, and then the aggregator will handle all subsequent transaction activity. Most aggregators also provide standard payment "templates" that streamline payment generation by allowing for payments that occur regularly to be preconfigured in the system, thereby eliminating redundant manual entry. Although this requires some setup at the beginning, such a process ensures that all subsequent payment activity occurs seamlessly and efficiently and requires as little manual input as possible. The same is true on the reporting side, as clients usually have to manually set up their reporting requirements and preferences in the system, such as what formats they want their reports made available in, whom reports are sent to, etc. However, once these preferences are fixed, treasury has their workload minimized moving forward and can receive the majority of their reports and bank statements with little to no labor required.

⊞ **Straight-Through-Processing:** When thinking of implementing another technology system, the image that comes to mind may be one of increasing complexity with regards to the IT infrastructure. However, treasury aggregation technology was created with the idea of streamlining payments and reporting activity so that less manual intervention is required and so that a client's systems can interact seamlessly with one another and with their banks. The integration of these systems with one another has been boosted further by the ongoing standardization of Application Programming Interface (API) protocols. Today, many of the top systems have been structured using the same set of APIs, which makes the exchange of information between each system more reliable.

As treasury aggregators increasingly penetrate the corporate landscape, they regularly come into contact with a number of ERP and TMS providers whose solutions are also used by the aggregator's clients. As treasury aggregators and TMS/ERPs are often used simultaneously by clients, the solutions providers stay updated on developments occurring within each other's systems so that integration between the solutions is streamlined. The same is true for bank systems. While it can be a complicated and time-consuming process to deal with individual bank solutions and portals, aggregators have a number of pre-existing bank connections available and can build out additional connections as necessary. This ensures that clients can have all their bank information flow through the aggregator without having to pull information from multiple bank systems.

⊞ **Centralization:** A crucial benefit for companies with employees disbursed globally is the availability of information through a single portal. This benefit is derived mainly through the use of SaaS-based aggregation platforms, as authorized users can log into the portal from practically any location and at any time. The result is that a single instance of data is instantly available across multiple locations and subsidiaries, which eliminates the possibility of misinformation or of different locations or employees working off different sets of data. This ensures that employees always have a central repository of updated, accurate information to work from, and it alleviates the strain of having to manually export and group information from multiple systems and portals.

⊞ **Expanded Functionality:** In addition to their core bank connectivity services, many aggregators have built out additional areas of functionality as part of their system. Some even offer their aggregation services as part of a larger, more sophisticated system, such as a TMS. In these circumstances, the aggregator may provide modules or components for FX trading, debt and investment activity, risk management, accounting, cash forecasting, and others. This allows for an additional layer of automation, as a single instance of data flows through each specific module and updates all pertinent ledgers and balances. It also enables for more processes to be completed centrally through a single solution, cutting down on systems complexity. For example, a successful payment conducted through the payments module would update the cash management module and be recorded on the G/L in the accounting module, and any bank reports or statements would be recorded and stored as part of a bank account management (eBAM) module. Although this information can also easily be passed on to a TMS or ERP as well, vendors that provide all this functionality through a single system offer an additional advantage in reducing systems complexity and avoiding unnecessary maintenance and subscription costs.

TREASURY AGGREGATORS: TECHNOLOGICAL BENEFITS

AUTOMATION

A treasury aggregator can alleviate the strain placed on treasury and other departments by carrying out many of the payments-related tasks that have traditionally been performed manually. This includes the use of preconfigured payment templates for initiating payments, and also the exportation of statements and reports from bank portals directly into the aggregator's system. By automating these tasks, treasury can shift their focus to other responsibilities.

CENTRALIZATION

By providing a single portal through which all payments and reporting activity occurs, treasury aggregators ensure that a single source of data is available for managing and analyzing company-wide transaction activity, including that of multiple departments and subsidiaries. This benefits treasury, as it alleviates the strain of having to manually export group information from multiple systems and portals.

STRAIGHT-THROUGH-PROCESSING

Treasury aggregation technology was created with the idea of streamlining payments and reporting activity so that a client's systems could act seamlessly with one another and with the systems used by banks. Treasury aggregators regularly partner with TMS and ERP providers to ensure that the interactions between their systems are optimized, and they have also built out tools for downloading information from bank portals for exportation to their portal or another internal system.

EXPANDED FUNCTIONALITY

In addition to their core bank connectivity services, many aggregators also offer functionality in other treasury-related areas. This could include modules for FX trading, debt and investment activity, risk management, accounting and reconciliation, or cash forecasting. The provision of each of these modules through a single system provides a further level of automation for firms and offers additional advantages through the reduction of systems complexity and the avoidance of unnecessary maintenance and subscription costs.

Although each of the functional benefits provided by aggregators are in some part shaped by technology, it is important to touch on the overarching technological benefits that a sophisticated bank connectivity system offers.

Best Practices

TREASURY AGGREGATION SYSTEM USE: BEST PRACTICES

As with any financial technology solution, there are a number of factors to consider when undergoing an implementation or beginning a selection process. Where treasury aggregators are concerned, the following categories are notable areas that must be prioritized.

⊞ **Selection Project:** For firms considering a selection or RFP process for treasury aggregators, it is important to be aware of what questions to ask vendors as a means of differentiating one solution from the others. While all treasury aggregators offer the same core services, the specific components and features of each solution can vary. For instance, the cost structures for different vendors are often presented in a number of ways, with implementation costs for one being much higher but with lower subscription costs, and vice versa. The user interfaces also look quite different across the full range of aggregators, and any firm planning on using the aggregator's portal regularly should prioritize finding a solution with an appealing and intuitive display. Furthermore, each aggregator maintains their own unique set of bank connections; some might have thousands of connections, others may have hundreds. While aggregators can build out any connections they don't already maintain, this can take time and may also add costs if a client requires multiple new connections. Other important items to consider include the customer service structure, additional functionality offerings, available security components, and compatibility with third-party systems. Finally, for organizations looking to ensure the long-term financial stability of their selected provider, performing due diligence on the number of clients they maintain, their size and position within the industry, annual revenues, R&D, and financial backing or resources is also recommended.

⊞ **Implementation Roadmap:** When structuring an implementation roadmap, it is important to understand that no two implementation projects are the same. When developing a timeline for implementation, some firms may choose to structure their roadmap based off an implementation they've done in the past. While this strategy can be of some help, it can also result in an inaccurate and unrealistic timeline. Implementations can vary largely from one project to the next, depending on the size of the company, the number of banks that must be connected to, the existing technology infrastructure of the firm, differences in regulations for operations in multiple countries, the resources (both financial and staff-related) of the vendor, and the existence of multiple subsidiaries or company branches. An implementation that requires integration with both a TMS and ERP, as well as connectivity to SWIFT and also 10-15 direct connections to banks dispersed worldwide, will take longer than an implementation involving no other systems and requiring connectivity to only four or five banks. For these reasons, any implementation roadmap should be based primarily on a company's specific needs and layers of complexity. It is also best to include a relative timeframe for specific steps, rather than hard cut-offs (e.g. 2-3 months for the testing phase, rather than exactly eight weeks). As a general rule, it is best to overestimate the timeframe for an implementation and then exceed expectations than to set unrealistic deadlines that are constantly being delayed.

⊞ **Employee Training:** The period during which an aggregator is being implemented is the ideal time for clients and users to receive training on the solution. As any implementation typically involves a number of system demos and testing phases, these events can serve as opportunities for users to familiarize themselves with the specific components of the system and the layout of the interface. As the system is being configured, treasury should take every opportunity to test different payment scenarios to ensure each situation is handled appropriately by the system. For instance, if a payment is blocked, who receives an alert and how are exceptions handled? If a signer leaves the firm, how can the system be updated to reflect the change? How can new banks and bank accounts be added to the aggregator's system after an implementation? As a client usually has a greater access to the aggregator's support staff during an implementation, any questions or insights that the client requests can be answered more expediently here than after the "go-live" stage. For this reason, users should be proactive in identifying any potential issues or areas of concern that they have regarding the system during the test phase so that they are confident in their ability to use the system moving forward and so any lack of knowledge regarding system functionality does not impede use of the solution down the road.

⊞ **Internal Systems Integration:** Most companies that implement a treasury aggregator have a pre-existing financial technology infrastructure. This could include multiple solutions, such as a TMS, ERP, AP System, and payroll system, all of which may be used to generate payments. Thus, if the aggregator is to be utilized in its full capacity, integration with

each of these solutions must be established for purposes of centralizing and streamlining the payments process. Although the increased use of standard APIs has made it increasingly easy for these individual solutions to interact and share data, it is still necessary for treasury to adequately test the process through which data is exchanged via their internal systems to ensure its accuracy and validity. Common problems that can occur include messages being lost in translation, unsupported formats not making it to the intended destination, or messages being sent down the wrong channel. While these problems would be a large headache after a "go-live" stage, it is relatively easy to fix them during the implementation stage. Thus, ensuring that all these bugs are worked out ahead of time is a vital step in any integration project. As system integration is being carried out, it is also important for treasury to communicate regularly with the IT department and involve them in the implementation so that IT understands how the new solution fits into the existing technology infrastructure. While much of the system maintenance services are performed by the aggregator's staff, IT still needs to be aware of the components of the solution to satisfy security concerns, monitor system use, and help report bugs or identify process anomalies.

⊞ **Bank Onboarding:** One of the most time-consuming tasks associated with the implementation of a treasury aggregator is the bank onboarding phase. This is often an area that proves to be more complicated than organizations originally estimate, and it can be a cause of significant delay when attempting to adhere to an implementation roadmap. While some organizations may be able to utilize SWIFT or other networks for the majority of their bank connections, others may have a number of direct connections that must be established with individual banks. This can be a laborious process, including steps such as the following:

- Finding the appropriate contact at each bank.
- Corresponding with each bank for purposes of completing documentation and KYC requirements.
- Accounting for the various proprietary and other messaging formats in use by each bank (direct connections often involve the use of a custom format developed and maintained by the bank).
- Establishing a method for downloading payments and reporting activity from the bank's portal to the aggregator.
- Testing the connectivity channel to ensure that messages are being exchanged accurately and securely.

One of the primary reasons that bank onboarding can take longer than anticipated is due to the stringent documentation and regulatory expectations placed upon banks. These compliance-related tasks can cause unexpected delays in the onboarding process, and in extreme cases, can drag on for months. Thus, in order to avoid large discrepancies in the estimated-to-actual implementation timeframe, the period allotted for bank onboarding in an implementation should be given a large and flexible bandwidth.

As with any financial technology solution, there are a number of factors to consider when undergoing an implementation or beginning a selection process.

TREASURY AGGREGATION ITEMS TO CONSIDER

Selection Project
- Connectivity options and cost structures in use by each aggregator can vary.
- Perform due diligence on each potential vendor's financial strength and industry position.

Implementation Roadmap
- No two implementations are the same. Each roadmap should be customized according to clients' specific requirements.
- Provide banded timeframes for completing steps instead of using hard cutoffs.

Employee Training
- Best performed during the implementation stage.
- Serves as an opportunity for staff to become familiar with solution before "going live."

Internal Systems Integration
- Users should adequately test the compatibility of their systems with one another before going live.
- Common problems include unsupported formats and messages being lost in translation.

Bank Onboarding
- Can take excessive time due to compliance and documentation requirements for banks.
- Allow for flexibility during the bank onboarding stage in an implementation to account for unexpected delays.

CHECKLIST QUESTIONS TO ASK A VENDOR

As a firm looks to begin a selection process, and ultimately an implementation, they must be able to make clear distinctions between vendors and products for purposes of identifying the solution that most adequately matches their needs. In order to help facilitate this process, the following checklist provides a set of questions that organizations can use to differentiate the services and solutions offered by particular vendors.

1. WHAT CONNECTIVITY OPTIONS WOULD BE AVAILABLE TO US?

Can you host a corporate BIC and/or allow us to leverage your BIC if we do not wish to obtain our own? Do you maintain and can you establish direct connections to non-SWIFT banks? What other networks do you connect to? Although most banks may be connected to via SWIFT, many firms require direct connections or connectivity via alternative networks as well. Selecting an aggregator that provides a range of options for bank connectivity beyond SWIFT will give you the most flexibility moving forward.

2. CAN YOU HANDLE DATA TRANSFORMATION AND MESSAGE FORMAT CONVERSION?

An aggregator that offers data transformation and message converters gives you compatibility with a wide range of payment formats. A TMS will typically offer you a variety of payment formats, but various countries and currencies require the use of unique format standards that the TMS may have to put into their development queue. Selecting an aggregator with data transformation capabilities ensures that you will never run into an issue regarding an unsupported format.

3. DO YOU OFFER SANCTIONS SCREENING ON SWIFT AND NON-SWIFT PAYMENTS?

Through a capable aggregator, all messages sent and received should be automatically screened to ensure compliance with all relevant regulations. With sanctions screening, a non-compliant payment could be stopped in its tracks prior to being sent to the bank, at which time it would become a reportable event. Thus, choosing an aggregator that offers sanctions screening provides a valuable safety net that could save your organization countless dollars in penalties.

4. WHAT ELEMENTS OF THE PROJECT WILL REQUIRE OUR IT DEPARTMENT'S INVOLVEMENT?

Treasury departments often turn to aggregators to decrease IT dependence. However, the implementation of an aggregator does not necessarily alleviate IT entirely. Understanding what will be required of your IT department up front is crucial to ensuring a smooth implementation and also long-term satisfaction with the selected solution. If you inadvertently select a solution that requires extensive support from your IT department, you'll find yourself back where you started.

5. WILL YOU PROVIDE A DEDICATED PROJECT MANAGER FOR OUR IMPLEMENTATION?

The implementation process and project management team employed by an aggregator are crucial to the timeline and ease of the implementation. The process will generally be quite smooth if you select a vendor who offers a dedicated project manager with good technical knowledge and adequate time to devote to your project. Conversely, vendors without a dedicated project manager or that are struggling to handle multiple implementation projects simultaneously can impede project success.

6. PLEASE DESCRIBE THE CUSTOMER SERVICE STRUCTURE USED FOR ONGOING SUPPORT.

After the successful "go-live" stage of an implementation, a vendor's implementation project manager will turn over all subsequent client support tasks to the customer service team. Thus, it is important to understand ahead of time what the customer service structure is, the hours of availability, and what methods are available for interacting with staff (email, phone, online chat, etc.). The customer support structures can vary widely across the aggregator landscape, so take time to understand how the support process works for each vendor.

7. WHAT SECURITY OPTIONS WOULD BE EMPLOYED TO ENSURE THE INTEGRITY OF OUR DATA?

Depending on the specific aggregator, a range of security methods and components may be utilized. There is no standard set of security functionality employed by every aggregator. Thus, firms must look for the specific layers of security coverage that are most appealing to them. Asking each aggregator specific questions about the extent of their security coverage for information at rest and in transit, as well as for safeguarding entry to their portal, will help identify those providers with the most robust security offerings.

VENDOR ANALYSIS

The first section of this report provided an overview of the treasury aggregation environment as a whole and included analysis of specific trends and key drivers affecting the space. The overview section also provided an examination of the primary benefits obtained through the use of an aggregator.

Moving forward, this next section will provide a more in-depth look at treasury aggregation provider ECS Fin, and includes an analysis of their product set, testimonials and case studies, notable milestones in their development, and an overview of their global footprint.

ECS Fin

Company Overview

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info@ecsfin.com

PAGES 30-37

This content was produced by ECS Fin and edited by Strategic Treasurer.

COMPANY OVERVIEW

ECS Fin, an engineering firm that specializes in process optimization with a focus on transaction processing solutions, was created in 1999 in New York. The idea behind the creation of ECS began while a team of engineers was providing professional services to Fortune 100 companies. While this work was being performed, they noticed a number of inefficiencies related to application integration, enterprise messaging, transaction processing, data governance, and reporting. They believed that the processes in place were expensive, complicated, and time-consuming and often left users feeling dissatisfied with the functionality provided.

In 2006, they formulated the ideas of a solution series and branched out a development wing with the goal of assisting larger financial companies and corporates. In 2009, they deployed their first module and, ever since, have been adding customers and more modules to their Integrated Messaging Services (IMS). IMS consists of a series of message administration services, transaction processing modules, connectivity services, and supporting components. Customers can select and stack the flexible modules and services for building enterprise solutions. The modular approach allows for the use of individual products or one of the complete solution sets - IMS Gateway, IMS Payments, and IMS Settlements. The products are either deployed at a client site or hosted on the IMS Cloud. Each application is supported with web-based interfaces, dashboards, data governance, and reporting.

The majority of ECS's client base is located in North America and LATAM, with strategic clients also located in EMEA, Africa, and APAC. They have offices in the United States, South America, Europe, the Middle East, and Asia. Each location has a customer service center, all of which are available via phone, email, and online chat. ECS's revenue has steadily increased since its inception, and the company has continued to expand their organization to stay in front of client growth. ECS chooses to market their products on a broad scale, targeting banks, corporates, investment managers, and other large global organizations. From a market segment perspective, financial institutions and corporates with annual revenue of several billion dollars and up are ideal clients for ECS due to their highly sophisticated, enterprise-oriented solutions.

Company Snapshot

ECS Fin

Founded: 1999

CEO: Jacob Aruldhas

Headquartered: White Plains, NY

Ownership: Privately Held

PRODUCT SET

IMS Modules
(Available as installed , hosted, or cloud-based products)

- Systems Integration
- Bank Connectivity
- Application Integration
- Data Transformation
- Financial Messaging
- Payments & Cash Management
- Data Governance & Reporting
- Trade Matching & Settlement
- File Management & Storage

ECS FIN AT-A-GLANCE

ECS has **six offices** distributed throughout **the Americas, EMEA,** and **Asia.**

ECS's **senior management** originally **worked as financial** and **technology consultants** before founding their product wing.

Although ECS was founded in 1999, their **first IMS product** was **released in 2009.**

NOTABLE EVENTS

- **AFP Annual Conference**
- **SIBOS Conference**
- **NACHA Payments Conference**
- **EuroFinance Conference**

THINGS YOU SHOULD KNOW

ECS Fin has already introduced both **SWIFT GPI** and **real-time payments capabilities** with **The Clearing House.**

The **ultimate goal** of ECS Fin's functionality **is to achieve 100% STP RATES** for their clients.

Targeting primarily Fortune 1000 organizations, ECS Fin has acquired **50+ CLIENTS** since their inception.

Since the official release of their software in 2009, ECS has **acquired clients in each major world region.**

Headlines & Awards

Major Bank Selects IMS Gateway, ECS Fin's Enterprise Service Bus

In 2017, IMS Gateway, ECS Fin's Enterprise Service Bus and Message Hub, was selected by a large bank in Africa for enterprise messaging. The bank has streamlined all internal and external data flow while reaching STP with internal systems including core-banking, loan systems, and corporate payments while connecting to SWIFT and RTGS for clearing.

ECS Fin Releases SWIFT GPI Module

ECS Fin released their SWIFT GPI module in early 2017. The module comes with full workflows for banks and corporates. The main advantage of the module is that it can be implemented without any disruption to existing systems or internal technology infrastructures. The module provides SWIFT tracker information to the source systems and corporate customers in real-time.

Major Oil Company Based in Latin America Selects IMS Payments

In 2016, IMS Payments for Corporates, a module consisting of payment factory, application integration, connectivity, and SWIFT services, was selected by a large oil company in LATAM for automating treasury operations. The platform connects with domestic and international banks for automating integrated payables and receivables and for processing responses and statements.

IMS Securities Hub & SWIFT Service Bureau Chosen by Major Fund Administrator

In 2017, a major fund administrator hired ECS for automating payments and all supporting workflows for its investment management customers globally, as well as for transferring funds between multiple accounts, for making third-party payments, and for implementing complex payment workflows that include batching and sequencing. The project also included the engagement of IMS modules for collecting statements from a number of commercial banks in a variety of formats and delivering them to the fund administrator's customers in unified formats.

ECS Fin Gets Approval from The Clearing House for Real-Time Payments

ECS Fin released its real-time payments module in 2016. The Clearing House has declared this module as production-ready in 2017, following the successful testing of workflows including connectivity, preparation and transmission of payment instructions, receiving and processing of responses, and exception handling using MX message standards and formats. ECS Fin can engage banks and corporates instantly for real-time payments without having to make any changes on any of the source systems at either side.

CASE STUDY

ABOUT THE CLIENT

- Major hedge fund company based out of US
- Billions of dollars' worth of transactions annually

PROBLEM

- Manual preparation and transmission of payment instructions to Custodians/PBs
- Needed automation for receiving and processing acknowledgments, confirmations, and statements
- Difficulty in ensuring accuracy and internal security for various payment components

BENEFITS OF USING ECS FIN

- End-to-end processing of payments, all managed through a single platform/dashboard
- Addresses the needs of all stakeholders including operations, compliance, counterparty requirements, customer services, and all interested parties through roles and entitlements

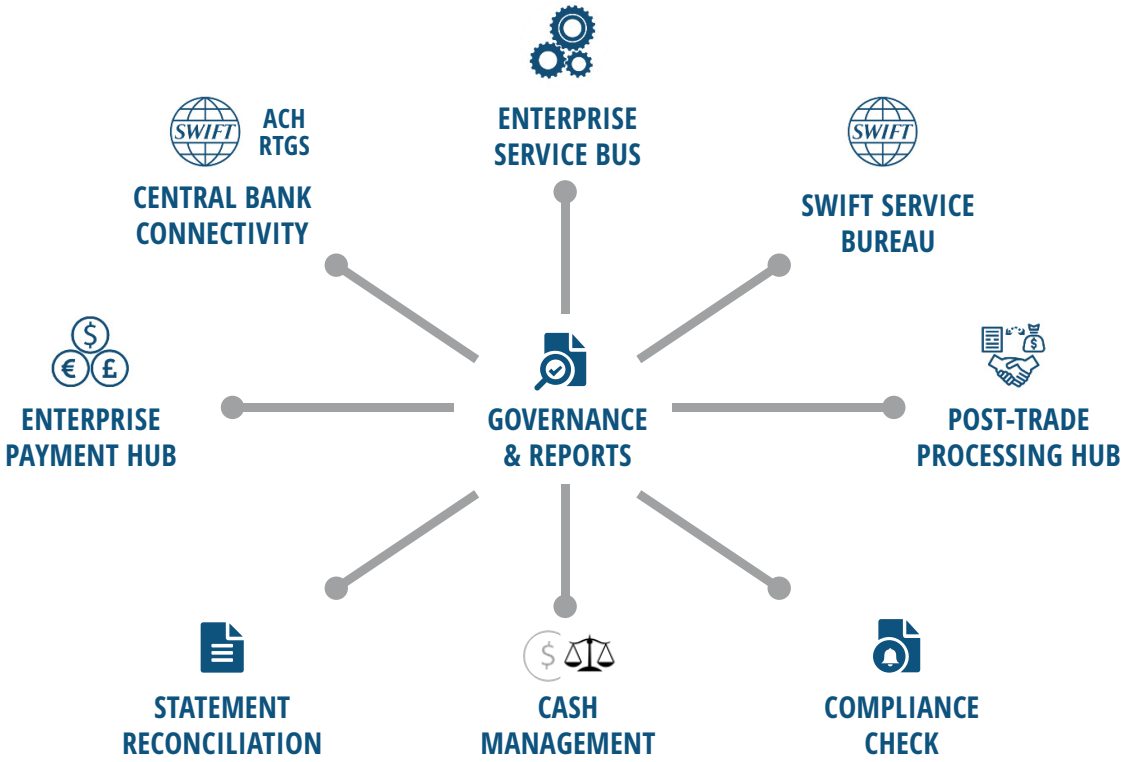
BENEFITS OF USING ECS FIN

- ECS offered a rapid implementation path, a few months compared to a few years as understood by the customer in evaluating other vendors globally
- ECS offered a completely integrated solution on a trial basis for users/operations to evaluate
- ECS's Test Simulator demonstrated system capabilities and performance prior to engaging target entities

FUNCTIONALITIES IMPLEMENTED

- IMS Payments, IMS Settlement

ECS Products & Services Landscape



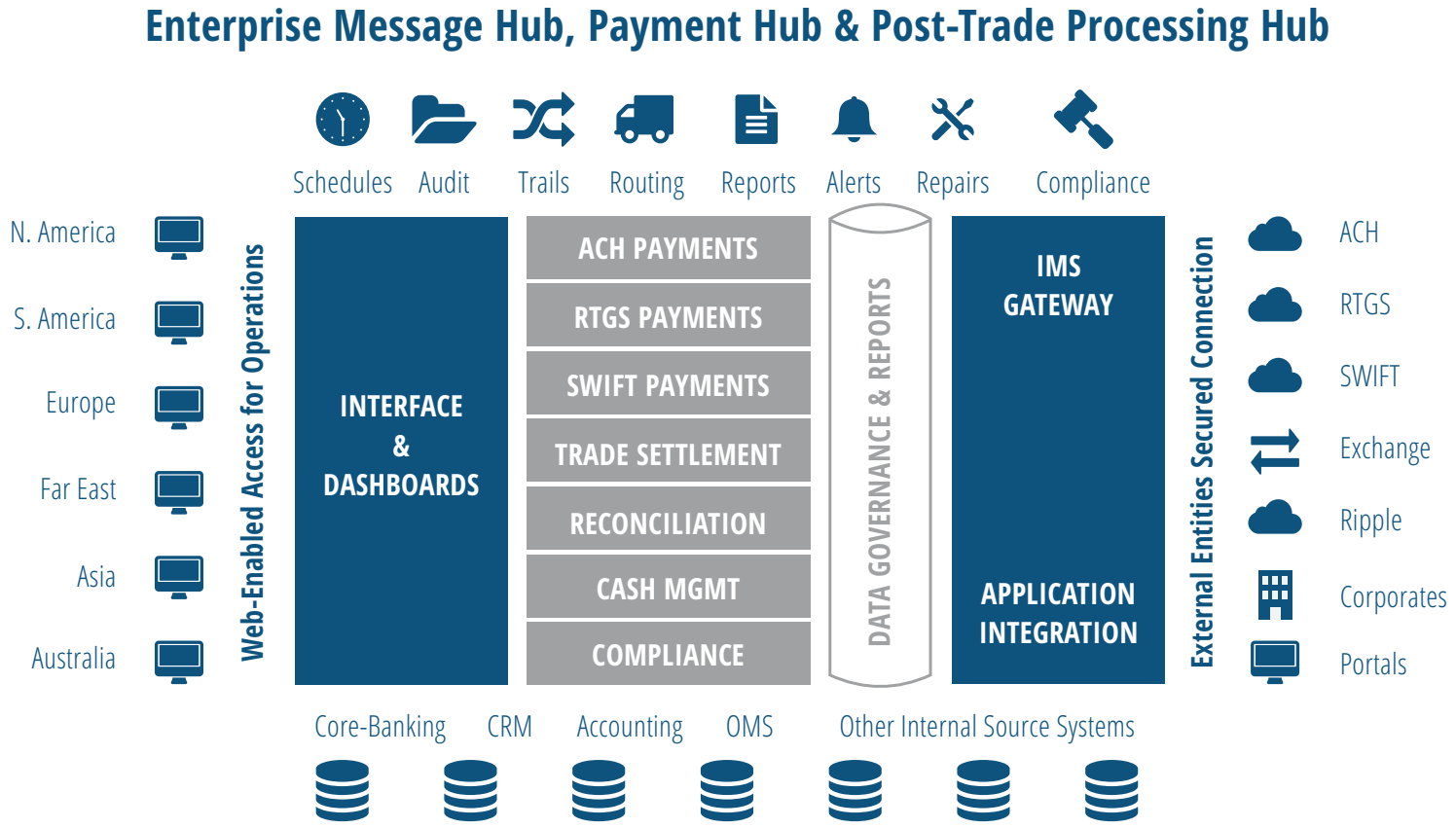
PRODUCT OVERVIEW

⊞ IMS Gateway

IMS Gateway, ECS's enterprise message hub, facilitates the efficient exchange of data between all internal systems and external entities for an enterprise. It introduces a well-organized control point supported by dashboards for visibility and an interface for user actions on each channel of data exchange. It is equipped with a series of message administration and data workflow automation tools that perform data identification, categorization, enrichment, transformation, and validation. Value-added services like duplicate checking and compliance checking can be engaged on specific types of data following different sets of rules. Connectivity services offer instant connection with any type of source system or external entities, supporting real-time, batch, synchronous, and asynchronous types of communication. The various functionalities of IMS Gateway service include application integration, message library creation and management, reference data management, data transformation, compliance checking, duplicate checking, data validation, and data subscriptions. Application integration refers to the easy and rapid integration between internal applications, external entities, and other services by providing instant connectivity, message transformation, data-flow modeling, workflow automation, and dashboards for internal controls.

Data exchanged through each channel can be viewed through enhanced dashboards that offer increased visibility to all areas of operation. Adding a connection with an internal application or an external entity can be completed instantly and in real-time through user-friendly configuration screens that allow the selection of connectivity protocols, message formats, and schedules. Similarly, adding a subscription for a specific type of data in any format or protocol can be performed instantly for a requesting party, which can be a machine or a user. Each connection or subscription added will extend its own dashboard, interface, approval cycles, exception handling, event management, and notifications. IMS Gateway can also assume the role of an Enterprise Service Bus. It can manage a series of connections with a number of source systems and re-sort data that should be transmitted to other source systems or a series of external entities. Clients of ECS can make use of enhanced data governance features that link

Product Overview



messages, documents, and events with reference data using the underlying transaction details for reports and audits.

IMS Payments

IMS Payments, a central payment hub from ECS, is a series of money movement modules, supporting components for treasury operations, and value-added services for instant implementation. IMS Payments automates the movement of money through all channels while addressing needs of various user groups and back office operations from initiation through to reporting. IMS Payments is complete with separate modules for addressing different settlement channels such as ACH and RTGS networks, as well as SWIFT. It also distinguishes different types of money movements like customer payments, foreign exchange, institutional transfers, and direct debit. ECS is also currently in the process of adding a module for moving money through Ripple. Users can choose to keep separate dashboards for each module or have consolidated views that combine transactions from multiple modules. IMS Payments includes modules for supporting components like cash management, compliance checks, statement management and reconciliation, and advanced reporting. The supporting components can be seen as individual modules from an operations point of view, although they are compatible with the core payment modules as value-added services. The system supports a number of different messaging formats and includes all known standard formats and most proprietary

formats for core-banking, accounting, CRM, etc. The SWIFT library includes MX/MT conversions, and the ACH library includes various flavors of ACH formats for different regions. IMS Payments additionally supports all proprietary formats and allows clients to download information in Excel, PDF, XML, or CSV. Users can subscribe to specific transactions in any language—English, Spanish, French, Chinese, Japanese, Arabic, Hindi, etc.

⊞ IMS Settlement

IMS Settlement serves as a post-trade processing hub that hosts a series of data processing modules like trade affirmations, trade allocations, trade settlement, securities transfer, money transfer, statement management, statement reconciliation, and securities positions and balances. The interfaces and dashboards enable clients to perform a multitude of functions directly correlated to matching trades and moving securities. Specific adapters allow the exchange of data with trade matching providers like Omgeo and trade enrichment subscriptions like Alert.

Trade Settlements, one of the widely requested modules on IMS Settlement, automates the complete trade settlement cycle, covering creation of instructions, management of sanctions, enrichment and validation of settlement instructions, confirmation matching, status matching, request for status, request for cancellation, and processing of responses from counterparties. It has the ability to prepare instructions from trade details received in most formats from various source systems, order management systems, accounting systems, and trade matching platforms. The money transfer module can generate money movement instructions from forms, through requests from other modules of IMS, and also from other internal systems of the firm. Notifications can also be prepared as part of the same transaction and transmitted to the parties receiving funds. Workflows are provided for trade confirmation, affirmation, settlement, and reconciliation, along with dashboards and interfaces for tracking, internal controls, exception handling, and report generation. IMS Settlement can connect to various counterparties of the trade via SWIFT or FIX, as well as ETC service providers like Omgeo and Accord. For incoming and outgoing messages, IMS runs a full set of sanctions filtering and data validation checks to ensure the compliance and integrity of the information contained within.

⊞ SWIFT Service Bureau

In addition to their modular product offerings, ECS operates as a fully-functioning SWIFT Service Bureau, which is a subset of their ECS Cloud service. Beyond offering the full range of SWIFT connectivity, ECS can connect clients to their banks through alternative networks like CHIPS, Bacs, and Canadian CPA (Payments Canada). ECS also offers clients direct (H2H) connectivity and can quickly accommodate for any banks a client needs access to. They support the full scope of messaging formats including both MT (ISO 15022) and MX (ISO 20022) messages, EDI, and BAI, among others.

CUSTOMER SERVICE & IMPLEMENTATION

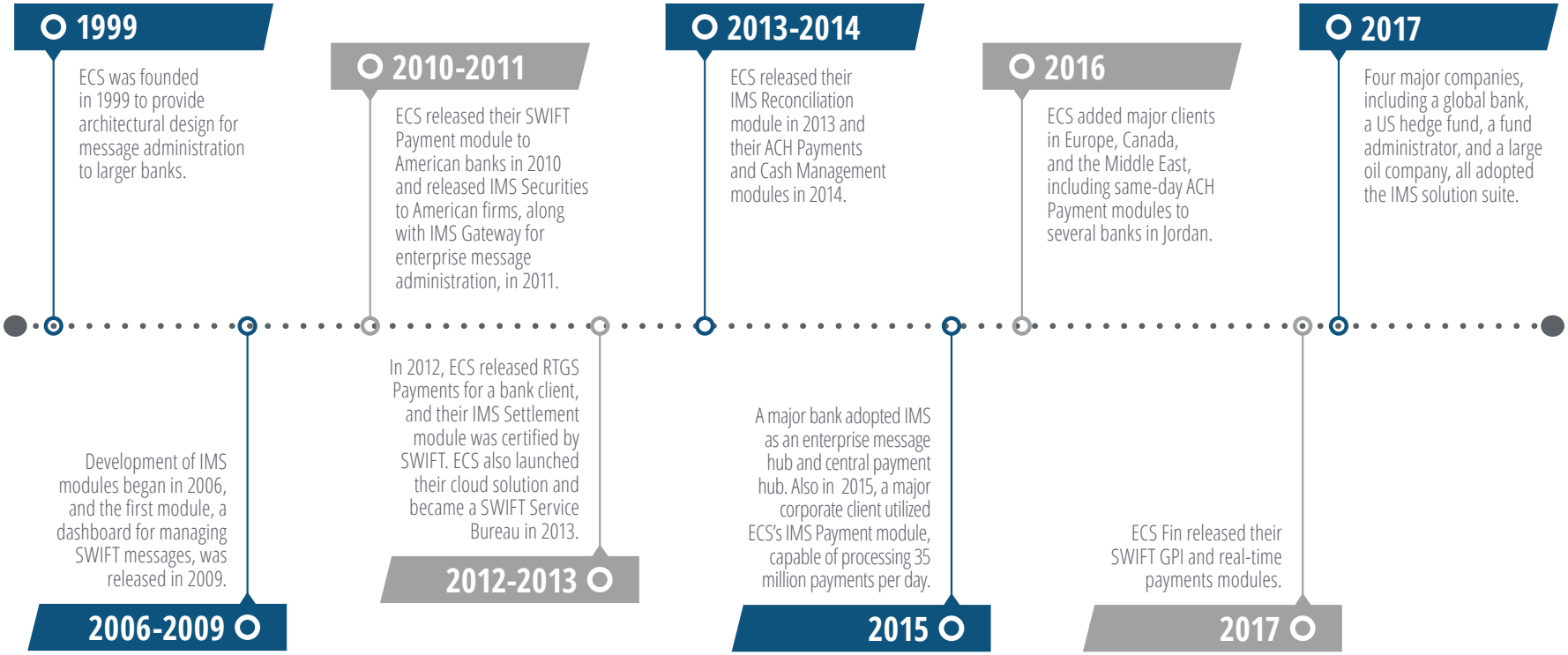
ECS offers 24x7 support through their globally distributed team. Support staff are available in New York, India, Malaysia, and Colombia to answer client questions. Staff are trained to interact with customers in a variety of languages. ECS also offers an online portal for opening tickets, support telephone numbers covering each region, and email requests. Email requests are generally most effective at speeding up issue resolution, while the portal is kept up-to-date, either by the customer or by ECS, to maintain accountability for every request that comes in.

ECS offers three different types of implementation:

- **Onsite Installation:** The application will be deployed at the customer's data center, and it will be fully integrated with relevant internal systems and external entities. The customer's client will have the option of directly connecting to the service at the bank or connecting via an ECS data center. When customers' clients connect via an ECS data center, they can send and receive data in any format/protocol, while the communication between ECS and the customer can be in a unified method that would not require additional work when new clients are added.
- **Hosted Solution:** The application will be deployed at the ECS data centers on dedicated instances. This allows the customer to maintain their data in an unshared environment, although connectivity services to the external entities like SWIFT and central banks could be shared.
- **Cloud Solution:** The customer could be added to the relevant services hosted by ECS in a shared environment. Although this option reduces maintenance costs, it is not recommended for mission critical services.

Regardless of the method used, the production-ready applications can be instantly utilized by the customer for evaluation and user-acceptance exercises. During this process, the configuration interface is utilized for addressing the

Company Timeline



needs of various departments, compliance divisions, and all interested parties who will have need for the services.

CLIENT TRAINING & EVENT ATTENDANCE

ECS Fin attends several events globally, most of which occur in either North America or Asia. SIBOS, the Annual AFP conference, Payments by NACHA, New York Cash Exchange, and EuroFinance are some of the major events that ECS Fin regularly attends. In addition to these, DotFinance and MEFTECH are some of the events commonly attended in Asia. For client training, ECS Fin provides one full week of training during implementation before the go-live stage. ECS Fin typically will train a few individuals extensively, who can then train the others within their group moving forward. Users are also provided with user guides for reference whenever needed, and can contact ECS Fin support staff for further assistance.

Regarding the above timeline, one particularly notable milestone occurred just this past year, as ECS received approval from The Clearing House as a Real-Time Payments (RTP) service provider. They are one of the first vendors to develop this capability, and will begin offering the service to clients in November 2017.

TESTIMONIALS

"Moving to ECS Cloud was a good and valuable decision for us. Our cash wires, securities settlement, foreign exchange, and reconciliation statements STP rate increased by moving to ECS. The system is very user-friendly and allows our team to research and reconcile issues faster than our legacy systems. The client service team is knowledgeable and responsive to all our needs, and we see them as a partner rather than a vendor."

Major US Hedge Fund

"My staff report that the dashboards and interfaces of IMS products are easy, simple, and meet our needs. They allow secure access to multiple customers from anywhere in the world, which is so important for a global operation like ours."

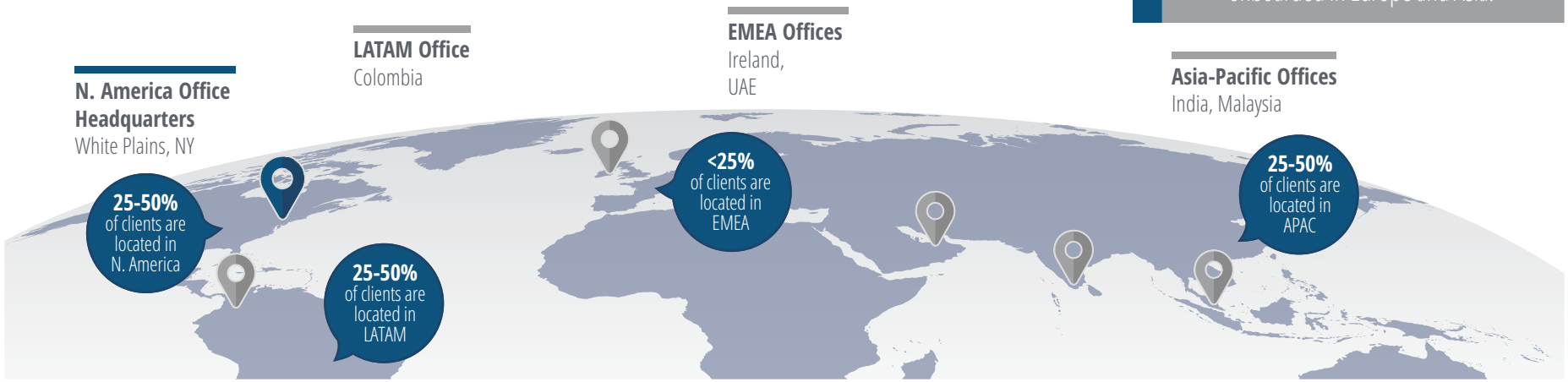
New York Corporation

"What ECS offered sounded too good to be true – however, we decided to utilize it as an interim solution based on promises of rapid deployment cycle and production readiness. While doing our due diligence, we realized that we have the best solution in the industry."

Bank in South America

ECS FIN GLOBAL SPREAD

Since the official release of their platform in 2009, ECS Fin has seen the strongest growth come through their North America and LATAM-based operations. However, between 2014-2016, groups of new clients were also onboarded in Europe and Asia.



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- **Figure 2, Page 8:** *Fides Treasury Services & Strategic Treasurer 2016 Global Payments Survey.*
- **Figure 3, Page 9:** *Fides Treasury Services & Strategic Treasurer 2016 Global Payments Survey.*
- **Figure 4, Page 9:** *Bottomline Technologies & Strategic Treasurer 2017 Cash Forecasting Survey.*
- **Figure 5, Page 10:** *Fides Treasury Services & Strategic Treasurer 2016 Global Payments Survey.*
- **Figure 6, Page 10:** *Fides Treasury Services & Strategic Treasurer 2016 Global Payments Survey.*
- **Figure 7, Page 11:** *Bottomline Technologies & Strategic Treasurer 2017 Treasury Fraud & Controls Survey.*
- **Figure 8, Page 11:** *Bank of America, Bottomline Technologies, & Strategic Treasurer 2017 B2B & WCM Strategies Survey.*
- **Figure 9, Page 12:** *OFAC penalties assessed statistics provided by treasury.gov.*
- **Figure 10, Page 12:** *Bottomline Technologies & Strategic Treasurer 2016-2017 Treasury Fraud & Controls Survey.*
- **Figure 11, Page 13:** *Bank of America, Bottomline Technologies, & Strategic Treasurer 2017 B2B & WCM Strategies Survey.*
- **Figure 12, Page 13:** *Bank of America, Bottomline Technologies, & Strategic Treasurer 2017 B2B & WCM Strategies Survey.*

STRATEGIC TREASURER **MARKET INTELLIGENCE**

ANNUAL INDUSTRY SURVEYS

Strategic Treasurer conducts 9 annual industry surveys designed to evaluate and analyze various strategies and practices across a number of key areas of operation, such as bank account management, compliance, treasury security, cash forecasting, payments, risk, technology use, and supply chain finance. These surveys are completed by a host of financial professionals from banks, non-profits, corporations, and other organizations across a number of different industries, locations, and sizes. Strategic Treasurer reports their findings through survey results webinars and by publishing survey summary reports. Strategic Treasurer is also able to use this data for aiding organizations in conducting benchmarking and for identifying the leading practices across various segments of the industry.

BAM & FBAR

Bank account management is one of the pivotal processes performed by treasury to ensure compliance with regulations and achieve account visibility for purposes of reporting, maintaining security, and managing risk. With the number of new regulations continually on the rise, this survey seeks to gauge treasury's reaction to the increased regulatory restrictions and compliance expectations that surround the industry and to measure the effectiveness and popularity of bank account management and FBAR services as offered through treasury technology.

GLOBAL PAYMENTS

This survey seeks to measure and calibrate the practices, plans, and priorities for payments on a global basis from the view of corporations and banks. There are many changes and challenges confronting these industries, including the heightened risk of fraud, enhanced regulatory measures, and increasing complexity through the creation of additional payment networks. This survey covers a range of important payment structures and practices, along with developments in faster payments, cross-border innovations, and new technology influences, including blockchain.

LIQUIDITY RISK

This survey seeks to evaluate current liquidity risk mitigation practices and capture both major and minor shifts in corporate strategies as macroeconomic changes and new regulations continue to impact how treasury operates. Key areas include corporate policies and procedures for measuring counterparty exposure, changes in investment policies, evaluations of investment channels, how new regulations are affecting corporate risk strategies, and what levels of visibility organizations maintain into various areas of exposure for purposes of managing their risk.

B2B PAYMENTS & WCM STRATEGIES

As the B2B landscape evolves, continued economic globalization is having a momentous impact on the strategies through which organizations manage working capital and handle their payment operations. This annual survey captures the responses of both bank and corporate practitioners regarding their views on new payments technology, payment security, working capital management, and the current regulatory environment, as well as how they are thinking about payments and working capital today and tomorrow.

CASH FORECASTING & VISIBILITY

For treasurers, an accurate view of available cash is mission-critical. Transactions are taking place in a variety of markets across a number of currencies, and it can be difficult to gather and store all bank information for purposes of forecasting cash flows and maintaining adequate visibility. This survey seeks to gauge the methods by which organizations are seeking to achieve reliable cash forecasting and accurate visibility despite the growing complexity of banking structures. It aims to evaluate the effectiveness and use of technology in addressing these needs.

TREASURY FRAUD & CONTROLS

This survey covers a broad range of current practices and seeks to determine future methods of preventing fraud and implementing a strong controls system for treasury. This survey topic is of particular importance and highly dynamic given today's climate of new and changing methods of fraud and attack. Key areas of coverage through this survey include control framework and policies, cyber fraud, bank account and transaction level controls, fraud experiences, and policies related to mobile and personal device use.

TREASURY TECHNOLOGY USE

This survey focuses on actual treasury technology use and will be used to determine current market awareness of solutions providers and the need for various modules/functions that they provide. The key aims of this survey are to measure the market's awareness of current TMS and Treasury aggregation providers, evaluate the industry's need for specific functionalities as they are performed by treasury technology providers, and pinpoint areas of the market where growth can be expected or where improvement is required.

ADDITIONAL SURVEYS INCLUDE:

- **Treasury for Higher Education**
- **Supply Chain Finance**
- **Treasury Operations**
- **Benchmarking & Diagnostics**

For more information, contact us at benchmarking@strategictreasurer.com.

ONBOARDING EFFICIENCY

Strategic Treasurer's dedicated connectivity team has helped numerous companies *simplify their bank onboarding projects by:*

- Structuring an expedient but achievable onboarding timeline.
- Serving as experienced project managers for the entire onboarding process.
- Handling all bank correspondence and documentation requirements.

Contact Strategic Treasurer today to learn more about our bank connectivity and onboarding services.

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TREASURY SECURITY ▪ COMPLIANCE ▪ TREASURY & RISK TECHNOLOGY ▪ FINANCIAL RISK MANAGEMENT ▪ BENCHMARKING ▪ STAFFING ▪ WORKING CAPITAL

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