EXCHANGE INVEST

Zero Hour: Towards A Real Time World Market

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Abstract

It's Time For Real-Time Clearing

No matter where you sit in the financial value chain extreme vigilance is essential to ensure coherent clearing processes rendering markets are as safe as possible.

Isn't it a rich irony that payment by bank often involves remarkable periods of inky blackness during which nobody seems to be able to pinpoint where the money is in the system? (Well, other than attributing blame to a different party thus abruptly absolving themselves of responsibility and leaving the customer, as always, poorer and in the dark), Alongside the banking status quo, similar blind spots exist throughout the capital markets value chain.

How can a parcel delivered by a modern logistics company be followed along its journey across the globe in real-time, while cash drops off the radar for hours, if not days, on end, before popping up at a location which may or may not be the correct destination? I call this "The Cobbler's Paradox of Capital." (That nobody can ever accept responsibility remains a whole separate area of study in the Kafkaesque world of payments). Such behaviour is not acceptable for airline baggage...to be the underlying transfer mechanism for the lubricant of trade, is simply ludicrous in the digital age. Fortunately, the likes of Transferwise are revolutionising the payment market.

As cryptocurrency readily shows, transactions can be smooth and speedy, delivered immediately in real time at ultra-low cost with payee and payer both kept informed during the (brief) transaction lifecycle.

Low latency dealing on exchanges has become the norm, followed by a globalised wait for the clearing process. The world's exchanges achieving T+0 is likely to take considerable time. In other words, it will be years yet before legacy bourses can emulate sports exchanges like Betfair who habitually settle within 15 minutes of market close.

In the vital area of clearing, the financial markets need to improve their latency. That is not at the front end which is a separate area for study in itself but rather at the back end of the process. However in a world where "the New York minute" is an age to sub-second trading activity, is it really sensible to have clearing systems trundling along a million times slower than the fastest bargains are dealt? I think not. The proportions of post trade need readjusting to reflect "the shock of the new" from algorithmic trading.

Nowadays we live in a derivatives world on a digitally connected planet. Markets must reflect this and fine tune their practices to hone every possible risk to be discretely measurable and clearly visible, not just in real time but at all times. When HFT companies like Hanmag or KCG can self-destruct within the lifecycle of a few Snapchat messages, clearing needs to be capable of coping in the same real-time window.

However, is it reasonable to expect the CCP industry to continue novating and managing risk, minutes, if not more generally, hours, in arrears of trades? The technology is readily available to facilitate real-time clearing - so why not deploy it? Besides, CCPs themselves are being inundated with new regulations requiring that they service markets several times larger than the entirety of CCP volume before the credit crunch…

> “Or, to put matters in perspective, it took Korean HFT business HanMag just 143 seconds of exquisite chaos to go bust. By contrast, most clearinghouses, at best, review their positions every 300 seconds.”

With the Blockchain threatening a widespread disintermediation of the analogue settlement paradigm, it is time to encourage a broad industry-wide initiative to endorse and deploy real-time clearing with real-time risk management as one and the same. The modern technology of banking and financial markets is vastly different from the original batch processing systems which first began to move banks away from paper ledgers to an electronic settlement realm. Moreover, if, in the broad commercial world, we can easily see our parcels, our shopping and pretty much everything else besides, in real-time, then why not mainstream financial markets? Instantaneous risk assessment can only help us measure and manage exposures to better avoid any form of financial problem.

technology. As the integration progresses, it provides real-time continuity and vastly reduces collateral requirements while making the whole edifice safer! Likewise, the London Metals Exchange has not merely created its own clearing house, it chose to leapfrog in technological terms to apply real-time clearing immediately. Thus integrity is strengthened in a market where the end result will be counterparties from China and India amongst the largest players within a truly global 24 hour marketplace rolling daily across the world’s commercial regions.

Real-time clearing, formerly a virtual impossibility, is now highly feasible with contemporary technology. Software can easily cope with vast dealing volumes while novating

> “Put simply, the old analogue process of CCP clearing houses raising their periscope every few hours to check on the waters at the surface, needs upgrading. True, it may be respectably efficient on most days but we need to be as accurate as is possible to avoid the worst damage that can be wrought when massive dislocations hit markets. The status quo won’t do.”

Already there is an emerging market vogue to adopt real-time clearing to not merely keep abreast of the low latency world of trading but also as a means to ensure that in a 24 hour globally interconnected day, no single time zone can create systemic risk. Exchanges such as the Brazilian BM&FBovespa have embarked upon landmark reforms integrating 4 clearinghouses into one with real-time

and applying margins to derivatives products simultaneously. Entire CCP portfolios can be re-evaluated in seconds with risk exposures identified and managed in real-time. Market participants can be margined in the here and now. It makes total sense to therefore make markets safer, stronger and more secure through the adoption of real-time clearing tools. Rather than lumping risk upon risk and

> “We must do everything within our powers to secure the safety of the clearing process from the top of the waterfall to its very bottom.”

waiting to assess it, why not evaluate and address risk instantly, thereby reducing the counterparty and market exposure to default? In a real-time risk world, those beholden to the batch are surely demonstrating an air of foolhardiness in ignoring the extra safety measures enabled by contemporary technology?

Harking back to settlement, let’s consider the cobblers’ paradox. Isn’t it absurd that bank dealers can buy shoes which can be physically delivered to their trading desks within 24 hours, yet if they buy the shoemakers’ stock it takes at least 2 days to settle (a dematerialised certificate)? First clearing must be real-time then we have a definite need for markets to lead the settlement process too...

Patrick L Young

November 2015.

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A Manifesto for Modern Markets

by Patrick L Young

“There will never be enough time in the day, but space is fungible; it can be overcome with speed. Karl Marx called it the “annihilation of space by time.”

-John Kasarda & Greg Lindsay, “Aerotropolis”

Figure: An Italian Futurist rendering of a speeding locomotive

We live in an era of remarkable speed.

A century ago the Italian Futurist movement was exemplifying the spirit of the age - the first where travel was being facilitated in every environment: air, sea and land, by mechanised vehicles. As FT Marinetti wrote in the "Futurist Manifesto:" "A racing car whose bonnet is adorned with great pipes, like serpents of explosive breath—a roaring car that seems to ride on grapeshot—is more beautiful than the Victory of Samothrace," (referring to a famous Hellenistic sculpture in the Louvre).

At that time, the notion of powered, lighter than air, travel; of racing cars which could do over 100 miles per hour and trains that could cruise several times faster than a horse for hours on end, amounted to a massive upheaval in the established philosophy of human limitations with regards to travel, that had been taken for granted for millennia.

With the advent of internal combustion engines fuelled by gasoline, the pace of all development attained a relatively giddy speed. Yet it looks remarkably pedestrian compared to what was happening by the end of the 20th century.

Sociologist Melvin Miller refers to "the elastic mile" pertaining to our perception that distance shrinks as we move faster. In the digital age, we are also experiencing "elastic time" akin to Marx's

dictum. Thus the old postal service has been eviscerated as the notion of sea mail appears a hilariously anachronistic concept to modern youth who even struggle to cope with the, pre-digital, 'speed' of post war airmail taking days to reach one continent from another. True the telephone helped advance speed of communication but it was prohibitively expensive until relatively recent times. With the injection of competition in telecom markets allied with new technology, it is easy nowadays to call for essentially zero cents via the internet & VOIP.

Similarly where it costs relatively vast amounts to send data by post in hard copy format, nowadays the internet has made data transmission absurdly cheap by historical standards - and outrageously fast too! The fastest direct cable under the Atlantic, connecting the USA with the island of Ireland, Project Kelvin, can routinely power 100 gigabytes of data per second, something akin to nearly a million HD video calls or 600 million Skype[1] calls.

Private telephony has flourished despite lower and lower costs and equally a giddy collapse in latency for data.

The same could be said for publishing. Whereas the old line publishing industry traditionally required around a year to take a completed manuscript to publication, nowadays online publishing techniques mean the same full-length book can be formatted for an e-reader and delivered to the other side of the planet within days. Lean production has collapsed the size and scope of delivering goods the world over.

Of course, the old line publishing industry has perhaps moved more slowly than many other industries - although the difference is not quite so marked as may be anticipated in some sectors.

To whit, the financial industry loves to demonstrate a certain swagger that it has long been at the cutting edge of innovation. However, the truth remains that while often the zeroes are larger in a world of leveraged markets, the actual practice may be somewhat less avant garde than our industry would like to believe.

That said, financial markets have often been quick to adopt many technologies where they can show a profit. The telegraph was favoured early in its development by early trans Atlantic arbitrageurs between markets such as cotton between cities like Liverpool & New York for instance. Likewise telex and fax were swiftly deployed by markets soon after their invention.

Of course the arbitrageurs, as well as speculators, could deploy technology and also remarkable lines of credit. For settlement periods in markets had a remarkable length by modern standards of latency. Monthly settlement was common in Paris even after the Bretton Woods era ended while the London Stock Exchange had a series of fortnightly accounts (three weeks if there was a bank holiday during the account period). Thus speculators had a huge amount of free credit. Gentlemen could pay their stock account bills when they also remunerated every other merchant from their favourite restaurants to their club bar bills, tailors et al.

> “The fastest direct cable under the Atlantic, connecting the USA with the island of Ireland, Project Kelvin, can routinely power 100 gigabytes of data per second...”

[1] http://www.electronicsweekly.com/university-electronics/general/kelvin-trans-atlantic-fibre-speeds-research-lab-comms-2013-08/#sthash.Pftdvjlc.dpu

The historical basis for this seemingly lackadaisical practice of credit and risk management was both simple and logical, based upon the logistics of the early modern bourse era. The leading stock markets of the 1700s, London and Amsterdam regularly permitted cross listing of shares. However it took time to move certificates from one jurisdiction to the other. Hence the fortnightly settlement period (T+10) was established. The 10 day window equated a reasonable proxy for a courier to make the journey on horseback and by ship across the English Channel to, or from, the financial centres of Amsterdam and London. Despite courier transport improving markedly with the invention of first the steam engine (for locomotives & ships) and later the automobile, exchanges rather stubbornly stuck to the established settlement patterns, apparently oblivious to how the world was changing around their elegant Georgian facades.

Indeed it wasn't technology which really drove the markets forward at all. Rather it was the progressive spirit pursued by the brilliant (in market structure terms at least!) 37th President of the United States of America. Having abandoned Bretton Woods' currency strictures, Richard Milhous Nixon drove the process of deregulating stock commissions and hence injected a memorable competitive ethos into the previously rather protectionist marketplace[2]. The process also demonstrated the inability of many linear financiers to accurately predict the future upon confrontation with lateral events! When threatened with 'proper' capitalism, most were convinced they would be driven out of business. Rather, the new competitive environment propelled financial markets forward as never before, even with relatively little technological change occurring until at least 2 decades later.

It is instructive to note how Continuous Net Settlement looked like a radical new concept in papers such as the G30's report "Clearance and Settlement Systems in the World's Securities Markets" (1988). T+5 at the time was a major achievement. Recommendations

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to reach at least T3 from the G30 were recommended in 1989 but only adopted by the USA in 1996 while it took much of Europe until 2001... The UK moved from T+10 to T+5 in 1995, ending the old 'account' model. At this time, Germany claimed T+2 but had many settlement failures. France allegedly adhered to T+3 but realistically still settled most transactions on a monthly basis (aka T+20!). Naturally, the financial industry applauded its latest incrementalist lurch to the future when the major EU markets harmonised at T+3 in 2001 but it is a touch unnerving to see how cash markets have remained remarkably stagnant in innovation terms while the digital age has made a great leap forward in every other form of latency…

At the same time, a key technological development was improving the outlook for settlement latency. The gradual reduction in paper within the settlement system (even if some ledgers still mandate a final paper copy) was a great leap forward! For instance, the UK moved from Talisman (paper-centric) to Crest (whose troubled gestation is a clear contender for the worst IT project management in the history of markets) in 1996. Dematerialisation enables significantly shorter settlement by reducing the amount of paper that had to be carried (probably not by men on horses although financiers often have remarkable legacy technology lurking around their systems). However at the same time, the legacy problem left over was clearly banking.

Moreover, the realisation that any delay in settlement is a risk, has grown throughout

[2] Clearly the broader political history of Nixon's Presidency may lead to a different macro view but I am concerned here only with the minutiae of market structure. In that area, Nixon made a stupendous impact from the Oval Office.

financial markets. When my first book "Capital Market Revolution!" was published in 1999, breathlessly extolling "the future of finance in an online world" many equity market practitioners ridiculed my asserting the notion of CCP novation & clearing transactions in shares to help avoid settlement failure risks. Yet within a handful of years that process had become increasingly commonplace and is now almost ubiquitous in European markets amongst others.

Such risk management tools are akin to postal insurance for those who prefer their mail delivered by snail. However it seems distinctly odd to consider the idea that there is an insurance policy in the epicentre of settling a stock transaction to alleviate settlement risk when clearly the ultimate solution ought to be to deploy the tools of the online world and reduce the risk through shorter settlement windows?

The Scope of Opportunity

It's always difficult assessing just what the scope of opportunity is once the financial markets can get their systems cranked up to deal with real-time clearing and settlement capability in all asset classes.

I regard this real-time facility as inevitable - the major stumbling block currently is that the west may suffer the classic "Innovator's' Dilemma" scenario and that will only presage relative decline as eastern interests finally tire of the tedious geopolitical leverage being exerted by the monopower USA through SWIFT and other outmoded systems. Make no mistake, real-time clearing and settlement is as inevitable as London's Underground adopting driverless trains to break the stranglehold of anachronistic unionised drivers prone to striking. However, real-time clearing, like driverless trains, will take an act of will involving backbone, resilience and leadership. Many 'managers' prefer to see out their careers hoping they can avoid the massive upheaval from decades accumulating legacy systems which each individually and serially, generate significant systemic risks, particularly at the point of replacement. Thus it may take some time to emerge, in the west at least. Management recognise that there must be change, they just live in hope they can kick the can down the road to the next generation.

In search of a product or service which can deliver an illustrative example of the potential for growth and safety which will result in real-time clearing and settlement, I hit upon the following sector...

If we look at the world economy overall, between 1975 and 2005, global gdp rose 154%.

This is hardly a spectacular rise over 40 years but it reflects the long-term broad plateau of many western markets, particularly in the increasingly stagnant EU.

At the same time, reflecting the new golden age of globalisation (aided and abetted by digitisation), world trade grew a much more respectable (if not spectacular!) 355%.

At the same time, the value of air cargo traded globally climbed an astonishing 1395%.

The growth reflected a series of key trends which we can see in the world around us (even in relatively stagnant Europe). Clearly globalisation is one. Digitisation is self-evidently another. This paper has been drafted in an informal coworking space, Hanza Cafe in Torun, Poland, the UNESCO heritage protected city which was a member of the Hanseatic trading league and the birthplace of astronomer / economist / polyglot Nicolas Copernicus. Next door is a remarkable gothic building constructed during the Prussian era, purpose built for the postal service. The Polish Post is hardly a standard bearer of competence when it comes to parcel delivery

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world-wide but at the same time, confidence is enhanced by real-time tracking, even with this bloated government monolith. Modern day despatch involves tracking, often in real-time with the best courier companies and an incredible ability to guarantee delivery times (admittedly perhaps here Polish Post is stretching the example in this specific instance of reliability). However the key takeaway is that commoditization of delivery has been accelerated through an infrastructure which provides confidence to the consumer. Any user can readily garner data locating their parcel in the world whether as sender or recipient. Thus the air freight business has grown to be worth circa 35% of all global trade - aka in the region of $6.4 trillion by value...despite being less than 1% of the world's trade by weight!

Compare this widespread real-time monitoring of packages which is readily available to customers with the inky blackness of the utterly opaque system of clearing and settlement even at the banking level in finance. A morass of contradictory and bickering actors constantly blaming other banks, the customers themselves, indeed anybody apart from whichever bank's customer support (sic) you are currently dealing with. When facing such fetidly inept handling of our money, it is not merely evident that real-time clearing cannot come soon enough, it is also clear that perhaps even the dismally customer oblivious Polish post monolith wouldn't look so acutely inept were it only to be a financial institution…

As to the opportunity? Think how trade and finance will flow when we have the ability to actually pay for the goods faster than they can be freighted by air across the world? When it comes to clearing and settlement the world of high finance is seemingly oblivious to how the physical economy has moved on logistically. Couriers have advanced exponentially from the multi day process when a relay of firm steeds transporting stock certificates from Amsterdam to London by hoof power and sailing boat...was the benchmark for the white heat of settlement technology.

In figures? DTCC reckoned a decline of 70% in buyside counterparty exposure when espousing the move to T+2 from T+3 in 2014...that's a crunchy enough number to start with methinks.

True the march to replace T+2 instead of T+3 is upon us although at the same time recent events have opened some intriguing fissures in the settlement of markets. In many respects, the problem of settlement is one lurking within the aging copper pipes of the western banking system rather than the more recently developed emerging economies.

Indeed in the aftermath of the collapse of the Warsaw Pact, some markets east of the Oder river went from birth to great leaps forward as epicentres of progressive capitalism within little more than a decade. This has created some remarkable anomalies as these markets have found to their inconvenience... At the point where they seek to internationalise and attract greater investment from the established, wealthy, west, problems can arise with the steam powered analogue systems in the 'rich' world. When the Moscow Exchange (MOEX) wanted to make it easier for investors to access the market, they enabled settlement to leading European depositaries (CSDs) Clearstream and Euroclear. However this came at a settlement price, in more ways than one. One might argue, the resulting position was somewhat contrary to Marx's space/time dictum! In this case, the function of distance led to a slowing down, 'powered' by SWIFT and other antiquated systems in the midst of the western banking system. The restrictions were clear - the settlement period must be set at the prevailing T+2 time frame... despite the fact that Moscow was already settling in a perfectly efficient T+0. A curious case of the Moscow settlement paradox...

This raises a very odd conundrum about markets. Various new markets in the world of exchanges, including such minnows as the Nepal Stock Exchange, have been able to master the concept of risk reduction and automatic end of day (or even real time) settlement on a T+0 basis. Yet, Straight Through Processing (STP) capacity involves a significant wait of 2 days for settlement in the western world while incumbents pat themselves on the back for their cutting edge process modernity. This is surely odd. Two days odd, to be precise.

It's not just pure emerging markets either which have such remarkably rapid turnaround times. The sports-centric Betfair exchange can run thousands of markets on a busy day and habitually settles them all within around 15 minutes of the market closing (usually at the conclusion of a particular event).

Settlement risk is much reduced in a T+2 environment but at the same time significant problems can arise. Moreover when we look at the world of off balance sheet instruments then all manner of issues arise. As I have long said, "this is a derivatives' world." Moreover the dislocation of the last decade swiftly led the G20 leaders (not I might add that I am convinced most of them had the remotest idea what the G7 nations were talking about) to agree at the 2009 Pittsburgh summit moves to reduce bilateral trading of OTC derivatives and move that market into more convivial multilateral surroundings, not just for clearing but, as it turned out, trading too. Thus SEF-world was born on the planet of the swaps...

Perhaps slightly counterintuitively, where settlement has failed in the past, often it has been derivatives which have stepped into the breach. Thus when many markets suffered a simple dislocation in settlement for cash equities ("T+forever" as the wags termed it), it was single stock futures which created a working solution. Even as an early advocate for the Single Stock Futures movement I must admit to being blindsided that much less sophisticated markets were amongst the first to really see a spark in single name equity futures trading. In a curious way it was a little like the advance of Communism. Where Marx saw his theories being attractive to a proletariat in the industrialised nations such as Germany and the UK, it was actually the Russians in a much less advanced industrially economy which led the way to the Soviet and Marx's fascinating unparalleled poverty producing ideology.

In the case of Single Stock Futures, investors eager to buy capital appreciation in their rapidly developing markets were not much perturbed by the concept of buying futures and missing out on any possible dividends. These folks were, if you will, agents of pure alpha, seeking returns from price moves only. However when trading cash stock they often found themselves exposed when trades failed to settle (with alarming regularity).

Of course the wonder of organised derivatives markets is in that beautiful human creation, the very engine which manages risk with calmly measured aplomb, the clearing house. Central Counterparty is a magnificent concept and in standing between every buyer and every seller, the CCP concept delivers a remarkable level of risk management yet still has managed to enable leveraged trading around the world, with barely any difficulties to date. Long may there continue to be such a situation where the sun shines, even at the end of the waterfall!

At the same time, the modern CCP is still, in many ways, resting on the laurels of rather older practice. In the era when the Chicago futures markets laid out vast trestle tables to clarify 'out trades' the day after each session, there was a reason why it took a while to process futures trades - a vast quantity of paperwork was generated by pit brokers and traders for each and every bargain.

In the modern marketplace, floors have withered and all but died while the adoption of electronic trading technology has simultaneously rendered paperwork generation a tiny element compared with the analogue era. Yet this raises the question: quite why has CCP clearing not made greater efforts to move forward?

The traditional CCP exists rather like a massive submarine, perhaps the remarkable Nautilus of Jules Verne's "Captain Nemo" serves as an ideal template to ponder. Indeed that submarine's motto "Mobilis in mobili" is also an ideal moniker for a CCP, translating depending on preference as "moving amidst mobility" or "changing in the changes."

Thus the submarine begins the day by raising its periscope from the depths at around 0730 in the morning to check how matters are on the high seas. If the oceans are calm, the periscope is retracted until sometime around the magic 0930 time period at which stage the periscope again emerges - in this case to check that clearing and settlement equilibrium has been achieved. Otherwise the Nautilus may have to surface and challenge

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participants to perform a margin call or similar action to ensure market confidence in the CCP firmament.

Thus the periscope may be raised again over lunchtime and in the early afternoon & once again later in the session up to the market close. Taking such soundings of the strength of the market and its relative volatility every few hours during the day has been the traditional means by which exchanges have been supported by the wondrous process of CCP, which delivers the miracle of safety for speculation and risk transfer while enabling a central tenet of leverage.

True intraday margin calls are practised but they are generally a fairly blunt instrument (albeit a welcome and sensible blunt instrument) in the process of protecting markets.

Nevertheless, it is difficult to understand quite why when the tools are available to all CCPs, they are not eager to have them at their fingertips?

In a real-time world, there is no reason why we must maintain the outmoded proxy of regular ‘passes’ to inspire clearing system equilibrium. Moreover, the move to real-time clearing and risk management has accelerated in the last year, thanks in part to the dynamic input of the world’s leading independent exchange vendor, Cinnober, from Stockholm, Sweden. Each market exemplifies significant reasons why real-time clearing has so much to offer.

The LME has moved to real-time clearing as its position as benchmark in the world’s metals markets has expanded from short bursts of ring fixing to almost 24 hour per

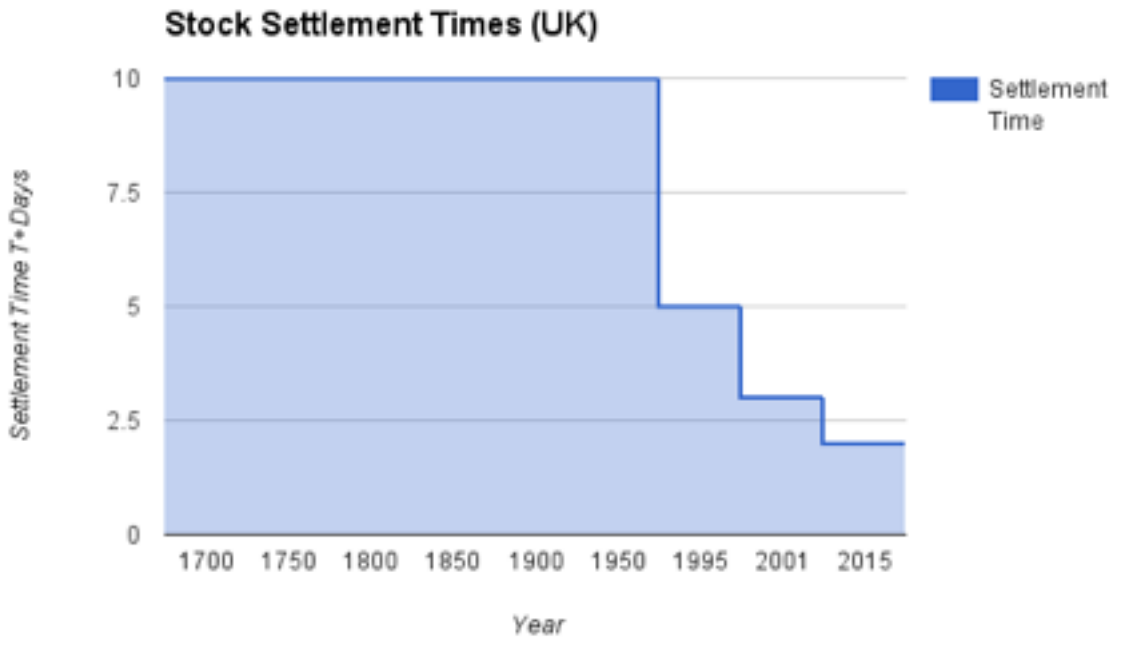
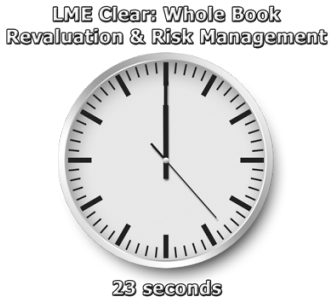


Figure: A generous summary of how settlement times have reduced...



day trading. Thus the benefits of immediately calculating real-time risk become marked as the trading day swings through the different regions of the world from Australia and China, (adjacent to LME parent, Hong Kong Exchange (HKEx) and through South-East Asia to the Indian subcontinent and gradually across Russia and into Europe before ending in the USA. Crossing so many time zones with discretely different players active in each, the LME is mindful of providing the ultimate confidence in its market and safety / security of collateral to participants in each and every region. Hence the decision to move to real-time clearing with the creation of the LME clearing house launched in 2014. Building LME Clear as a real-time CCP from the ground up was a groundbreaking move and as LME parent HKEx CEO Charles Li stated it "gives the LME and the Group the ability to pursue new markets, new products and new capabilities, particularly in extending the LME franchise to Asian time zones and in adding RMB capabilities."

The dynamics of BM&FBovespa are slightly different insofar as the market continues to focus on its domestic marketplace, with notable capital interest from investors around the world. However when dealing with a veritable cornucopia of asset classes in the national Brazilian market, it makes sense in every respect, maintaining confidence aforethought amongst them, in ensuring that investors in Brazil are secure with real time risk and clearing across multiple markets and asset classes in the fifth largest country on earth (by both geography and population).

However the story is much more than merely one of safety. In a complex cross netted multi asset class market like Brazil, the benefits of real-time clearing to the clients are equally significant. As BM&FBovespa COO Cícero Augusto Vieira Neto, has noted: "We have customers contacting us, thanking the exchange for lowering their collateral requirement up to 90% depending on the nature of the portfolio." That is a simply staggering number as the process continues to evolve across the 4 disparate legacy systems with considerable time lags into a single low latency environment.

Not only does real-time clearing synonymous with real-time risk management significantly improve the safety of markets deploying the most modern of systems but the ultimate benefit is more efficient markets, lower collateral for practitioners and therefore a genuine "win win" situation for everybody from regulators through participants to the exchange venues themselves...

The Johannesburg Stock Exchange in South Africa has merged its way to a multi-asset operation with the acquisition of the SAFEX derivatives market and the Bond Exchange over the years. However, arguably its greatest quantum leap under the leadership of Russell Loubser was the creation of an organised CSD. "Strate" revolutionised the once hyper-patchy settlement position in South African paper certificates. Nowadays the global JSE is moving to the cutting edge of providing real-time settlement. As JSE CIO Riaan van Wamelon has said: "The project we are embarking on seeks to process all asset classes from all markets on a single integrated solution and will enable our strategy for growth."

There is no logical reason for the CCP community not to adopt real-time clearing as a matter of priority following in the footsteps of pioneers such as DGCX, LME, BM&FBovespa and JSE who are deploying not merely real-time risk monitoring but a full suite of position keeping, margin calculation, collateral valuation and stress testing alongside real-time cross margining, pre-trade risk controls and what-if scenarios. Against that real-time management of multiple moving parts, the old Nautilus approach of raising a periscope to the market several times a day looks woefully outdated.

Looking To The Future

Then again CCPs in the derivatives industry are at least managing transactions intraday and, at worst, applying daily margins.

However, the legacy banking system and the world of payments as a whole are a huge drag on the world's market risk and settlement issues. Hence, no matter how much lipstick is being applied, the likes of SWIFT retains distinctively porcine qualities - western payments markets are still deploying systems which were, in places, first designed for punchcards and vast reels of tape on spools delivering about the same amount of total technological power in a reasonable sized room as is now available on a lesser mobile telephone (i.e. something a fashionable teenager would struggle to regard as having "smartphone" functionality).

Meanwhile of course the legacy systems issue is one which continues to trouble the development of even the world's largest financial markets. After all, Nepal could deliver real-time clearing and settlement of cash instruments a decade back while established western markets are only now gradually converging on T+2. In other words, for those in moderate latency terms, the modern (sic) western markets will soon be trading with microsecond tolerance at the front end and settling to a benchmark somewhere in the region of 173-216 thousand seconds… The front end is capable of trading, if not perhaps timestamping, well within the second increment (albeit we are reaching issues here with nanosecond benchmarking etc). However, realistically, how many industries would permit a tolerance in the region of 200000 times the length it takes to execute in order to settle? (When HFT is factored in, the ratio is significantly more than a million).

Naturally banks are conservative actors in the business of delivering improvement (as can be seen only too clearly with the general mediocrity of their approach to customer service world-wide in the digital age). Protected monopoly has its clear advantages to incumbents if nobody else but benchmarking financial markets to something which is decades out of date is a travesty of any proclamation that advanced markets are, well, truly technologically advanced by modern benchmark standards!

The next steps for markets, settlement and the like is therefore probably a revolution as opposed to the continuing consultant-hegemony of gentle incrementalism. This may deliver a dramatic bear market in the number of Powerpoint presentations being generated by folks in suits charging by the hour/day for their flowcharts and work plans but it will, at least, provide a sound basis to move the financial markets closer to the nanotechnological age, on the precipice of which, civilisation is now standing.

At the core therefore of the future of finance, it is time to create a genuinely unbound market, without the shackles of the ghastly payment systems and their ilk which are in any case masking IT which is itself close to pensionable age. This of course leaves us back with the elegant prose of Clayton M Christensen when he complied "The Innovator's' Dilemma" in the late 1990's. The difficulty is that for all the inspired PR prose of accelerator culture amongst various middle managers, the banking industry and indeed, in particular, the central payments networks, including the credit card companies et al... the incumbents are completely inadequately positioned to take advantage of the future because first it means having to fundamentally endanger their own in-built monopolies. That these antiquated methodologies will either atrophy or strangle development the longer they survive can be seen clearly from the way that Paypal, once created as the libertarian alternative to the banking oligopoly, has now become an expensive faceless travesty of digital oligopoly, dividing people by borders and currency units in a farcically arbitrary nature to maximise profits as opposed to delivering any genuine modern optionality. (In a remarkable volte face Paypal is now so inefficiently bloated it is often much cheaper to use banking services than Paypal's once revolutionary services - neither are acceptable in a real time digital age but the payments challenger has clearly failed to make a viable improvement to what are now its close cousins in reaction, the banks themselves).

The future is therefore not an incremental

improvement - hoping that Visa or Mastercard can reduce their charging policies from a de facto 3-7% (factoring in all additional levies for cross border/currency payments etc) to suddenly achieve a proper digital fractional cost…

Right now the dazzling ray of hope is clearly the Blockchain. Bitcoin and the Blockchain have suddenly leapt to being buzzwords in the financial sphere during the past 2 years although it has to be said depth of knowledge and understanding (even, worryingly, amongst those claiming specialist insight) is alarmingly slight. Perhaps this is just a curious clustering effect of the digital age - after all for every 100 social media 'gurus' there seems to be barely one or two holistically competent practitioners.

There is of course a full on bubble in fintech right now and Bitcoin / Blockchain is in the forefront but that doesn't mean the direction is wrong - merely the speed of travel. After all the dotcom bubble didn't eliminate the internet, it merely demonstrated that a lot of investors got ahead of the reality of the situation - which perhaps neatly brings us full circle to the world of cryptocurrency.

It's not that cryptocurrency and real-time settlement are essentially new - my own first book "Capital Market Revolution!" (FT Prentice Hall) was in the vanguard of discussing real time clearing, settlement and the rise of virtual money as long ago as 1999. However what the genius of the Blockchain provides is a highly viable means to achieve perfectly seamless essentially real-time settlement. I say 'essentially' as there remains a lag. The protocols built into Bitcoin have historically delivered a lag of about 8 minutes. On the other hand settlement of 500 seconds or less compares favourably with even T+2 trading which implies a rough average of around 200000 seconds, if not more, depending on the time of trade during market opening hours…

Moreover, the benefits of shorter settlement repay themselves inordinately quickly even on conservative calculations. Remember in Brazil, BM&FBovespa saw a staggering reduction of 90% in collateral requirements within weeks of real-time clearing being introduced at the CCP alone. Boston Consulting Group reckoned in 2013 that moving US equities from T+3 to T+2 would cost about $550 million and save annually $170 million, reducing the amount of broker collateral required by at least 15-24%. Those numbers materially improve the efficiency of markets...at T+0 the marketplace would be utterly transformed for the better.

There will indeed doubtless be means to reduce this lag through specific chains optimised for speed in future but the clear inference is that even the most 'modern' of securities markets are locked in a shuffle akin to a donkey, or, at best, a dray horse (certainly not a pedigree racing steed) while

> "We have customers contacting us, thanking the exchange for lowering their collateral requirement up to 90% depending on the nature of the portfolio."
>
> -Cícero Augusto Vieira Neto, COO BM&FBovespa

> “This new era, I like to call it Money Over IP.”
>
> - John McDonnell, Co Founder and CEO of Bitnet

the Blockchain looks like a high-performance supercar by comparison.

Already the Blockchain is delivering process improvements in some places where otherwise market transactions would be impossible using the expensive, sclerotic legacy payments systems architecture. Bitbond, for example, is a fascinating Peer to Peer (“P2P”) lending platform. Using the Blockchain as the core mechanism of transfer, Bitbond enables loans, often for small amounts such as $100 to be sent around the world and repaid. Thus small businesses which would not otherwise be able to borrow money, certainly not from the west without incurring prohibitive bank fees, can be serviced easily and cheaply - anywhere! That the legacy banking / payments oligopoly cannot service this form of market at all only goes to show how regulatory oligopoly status or no regulatory oligopoly status, the old world of banking and payments dating back to the Medici era... is now doomed to a lingering death, unless it can get to grips with “The Innovator’s Dilemma” and other crunchy legacy issues.

Ultimately we find ourselves at a crossroads. While markets may spend their days fascinating about the future in investment terms, it is clear that operationally they struggle to cope much beyond the linear issues of the present. Yet markets have dematerialised. A derivatives world has embraced electronic trading which means just about any form of asset can be turned into some form of traded security - from the air we breathe to the length of time our lungs may help individuals breathe it.

There may be digital process in the current western financial system for banking payments and settlement but it is essentially an analogue process modernised by some embryonic technology, more the mechanics of Babbage’s counting machines than the silicon wafers of digital modernity. The future of settlement has at its epicentre the new era enabled by technologies such as the Blockchain. John McDonnell, Co Founder and CEO of Bitnet has defined the most elegant term I have yet heard for what is happening to the cash nexus and how that will impact clearing and settlement processes as all markets make the great leap towards real-time processing - the holy grail of T+0. In John McDonnell’s words, we’re now in a world of MOIP - Money Over Internet Protocol. That is a perfect acronymic synthesis of where money must go and indeed where markets must follow, with very low latency.

Whether the bankers can come to terms with that in time, ought not to be our concern - although it is a worry that regulators simply may not be able to cope as they already have a somewhat quixotic understanding of financial innovation (mostly involving judicious quantities of denial, mixed with vast doses of fear, I am concerned to note).

The better markets in a more open, transparent world of derivatives and cash instruments must be supported by the best deployment of contemporary technology to deliver the greatest safety. The era of MOIP is almost upon us. That makes real time markets in execution and clearing an essential innovation for the sake of all our financial futures.

Patrick L Young

HFT Order Time

0 seconds

LME Clear: Whole Book Revaluation & Risk Management

23 seconds

Hanmag

circa 143 seconds

Average Blockchain settlement for Bitcoin

circa 500 seconds

Average equity settlement time

circa 173000-216000 seconds

… and don't forget those latencies at the front end which make Hanmag look like a lifetime…

About the Author

Patrick L Young is a 30 year veteran of financial markets, who has been working online in web e-commerce of one kind or another, since 1994. He is noted for his incisive futuristic thinking in finance and other areas which has included books such as “Capital Market Revolution! - the future of finance in an online world” (FT Prentice Hall 1999). A former exchange CEO, Patrick has advised many leading exchanges and their investors worldwide and served on multiple other boards and advisory boards. He is CEO of crowdfunding platform HanzaTrade and via his DV Advisors business works with the world’s leading investors in market structure as well as publishing the daily industry newsletter “Exchange Invest.”

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“Towards A Real Time World Market” has been published to launch the special download section at Exchange Invest. Other longer form industry discussions are available for download via ExchangeInvest.com in order to stimulate analysis, debate and discussion as we work towards better markets for all. Contributions are welcome.

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