

Ideas for Product Features

 ... brainstorming ideas for new or augmented, data-driven **product features** for fund oversight solutions

- product features will derive insights from data to provide new solutions (or alternative ways to arrive at current solutions)
- for instance, a data-driven way to identify, analyse, and make decisions about exceptions

Client Objective

- product features need to satisfy the **client objective** of providing key stakeholders with a context enriched confidence level in a given NAV (meeting the below criteria)
 1. being able to be quantified as an expression of, or proxy for, operational certainty relating to NAV validation
 2. be intuitive and insightful providing insights that conventional NAV validation techniques do not
 3. be operationally relevant and actionable, further improving efficiency and derisking oversight of official NAV dissemination

Ideas

1. risk assessment
2. exception clearance
3. market data validation
4. systematic analysis
5. validation-onboarding correlation
6. benchmark comparison
7. process health & timeliness
8. dynamic tolerance levels
9. fund group outliers
10. fund calendar
11. advanced reporting
12. market news analysis
13. automated narratives
14. cognitive workflows

Product Features

- risk identification
- risk analysis
- risk evaluation
- AI-assisted exceptions
- AI-augmented auto clearance of exceptions
- AI-driven exception clearance
- market data check
- recommendation engine for systematic issues
- recommendation engine for validations
- automated benchmark analysis
- manual effort estimates
- process analysis
- automatic tolerances
- found group anomaly detection
- interactive fund calendar
- Management Information (MI) dashboard
- sentiment analysis on market news
- automated commentary
- automated narratives
- AI-highlighted processes
- AI-assisted workflow
- virtual assistant

Detailed Overview

number	idea	description	product feature
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1	risk assess ment	<p><i>Q1: "What if there is a solution that can identify, analyse, and evaluate areas of risk across the fund?"</i></p> <ul style="list-style-type: none"> assessing risk in transaction data is labour intensive task when implemented as procedural, rule-driven process risk assessment of NAV can be done by looking at historical data of funds and their NAV and pointing at areas that may be risky or look like an anomaly AI can create fund characteristics to give clients confidence that based on those characteristics an anomaly was detected in the fund <ul style="list-style-type: none"> fund characteristics can be in the form of proportional relationships with some stats behind this is part of explainability and interpretability of machine learning solutions <p><i>Q2: "What if there is a solution that can quantify the uncertainty of NAV?"</i></p> <ul style="list-style-type: none"> we can already know the reason when the exceptions are created if we can routinely validate data in the background as we run validations <ul style="list-style-type: none"> looking at all data, not just exceptions for instance, an anomaly can be present in funds that have the same valuation point (else this is different) if most of them invest in the same stock and few in something else <p><i>Q3: "What if there is a solution that can point to areas that drive the uncertainty of NAV?"</i></p> <ul style="list-style-type: none"> we can look at every aspect of market calculations (price factors, etc.) and do a category check (if it is an equity, etc.) this is under the assumption that we validated all fundamental data (quantified the uncertainty of NAV) and the category movement is okay (if all impacts add up) <p>fund anomaly</p> <ul style="list-style-type: none"> anomaly can be an asset that is across many funds if in some that asset is not currently traded (no transactions) anomaly can be a corporate action in a fund if it is treated differently than in other funds (pricing, income, fees calculation, size of fund) <p>fund risk & areas of high uncertainty (assumptions)</p> <ol style="list-style-type: none"> funds with manual entries in the system <ul style="list-style-type: none"> risk goes up for anything done manually funds with fundamental data that do not correlate to checks <ul style="list-style-type: none"> prices may not match or data availability does not allow the validation process (not enough data to run correlation checks) we can resolve the category check through fundamental data <ul style="list-style-type: none"> this is perhaps similar idea as with the fair value processes when people want the fair value on stock, e.g. whether you should apply the value on Japan stock considering the time difference on different markets (vs US or Australian market that is still moving, even though the Japan market is already closed) funds overall characteristics can make them more or less risky (or more or less difficult as determined by each client) <ul style="list-style-type: none"> funds with more stocks have more risk than funds with less stocks hedge funds will have more risk than "normal" funds funds with lot of derivatives have higher risk than funds made up of "normal" stock funds that hold complex assets are usually determined as difficult (depends on clients) <ul style="list-style-type: none"> funds with derivatives are complex as corporate actions for them are complex type of asset and the combination of assets can make find easy or difficult <ul style="list-style-type: none"> for instance, number or size of transactions, size of holdings, number of assets, number of assets that are difficult to value (pricing of private equities or OTCs) 	<p><i>risk identification</i></p> <ul style="list-style-type: none"> AI highlights specific funds and areas of risk that should be investigated <ul style="list-style-type: none"> for instance, it can identify funds with more risk in them than other funds and also provide this result with some quantitative measure and confidence clients can specify their own risk areas of interest to be informed about it provides quantitative risk measures via the below 4 distinct capabilities <ol style="list-style-type: none"> identifying fund characteristics <ul style="list-style-type: none"> recognising factors that impact the risk of the fund spotting anomalies across the fund and highlighting those that require specific investigation <ul style="list-style-type: none"> recognising areas of high uncertainty in the fund highlighting if corporate actions on a single stock were applied (or not) and if funds should have transactions for particular assets <ul style="list-style-type: none"> for instance, we suggest to investigate or clarify a fund that did not apply a corporate action to a particular stock (we have no transaction) if other 10 funds invested to that stock and applied that corporate action (we have the transactions then) a fund with no transactions for a particular asset should be picked as an anomaly if other funds have transactions for this asset quantifying the uncertainty of NAV by calculating the values <ul style="list-style-type: none"> how much the NAV is out of the correct value pointing at drivers of uncertainties, uncertainty of NAV <ul style="list-style-type: none"> a hierarchy (bottom level of securities) can explain why there was a move, aggregate to asset category, and then to NAV we can know the reason why all components of NAV moved and surface the important ones (if all assets have moved) this can be a commentary for the NAV movement at the top level why its components have moved for instance, "A price of security has moved because of stock or index has moved." <p><i>risk analysis</i></p> <ul style="list-style-type: none"> AI determines the likelihood (probability) that the risk could materialise AI determines the consequence (potential impact) for a given client's risk assessment methodology (or defines its own) <p><i>risk evaluation</i></p> <ul style="list-style-type: none"> AI categorises risks according to client's risk appetite (high-medium-low tolerance) this is a preparation for the next stage of risk management (risk treatment) in which AI can identify the appropriate actions for each risk category (treat, transfer, accept, and avoid the risk)
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2	exception clearance	<p><i>Q1: "What if there is a solution that can point at anomalies and identifies them as exceptions?"</i></p> <ul style="list-style-type: none"> we can identify breach for the fund we did not raised any exceptions we can look at anomalies to see if the fund is using different prices <ul style="list-style-type: none"> for instance, there can be an anomaly on the fund that corporate actions is not applied to when they were applied to all other funds we can try to find exceptions that procedural exceptions cannot find now (instead of trying to clear them) <ul style="list-style-type: none"> this has arguably more value than clearing exceptions we already know there should be less false-positive exceptions if we can find a way how to deal with unknown exceptions current RPA cannot deal with unknowns, but if we can find a way how to flag those as anomalies this may introduce more validations to run for clients, but we hope that finding such exceptions that cannot be currently picked up will eventually reduce the number of current exceptions clients get <p><i>Q2: "What if there is a solution that can make the auto clearance of exceptions more cognitive?"</i></p> <ul style="list-style-type: none"> augmenting and replacing the currently rule-driven RPA with data-driven functionalities <ul style="list-style-type: none"> for instance, we can focus on the clearance of exceptions we already know clients can currently subscribe to particular checks and run less than half of available validations on average <ul style="list-style-type: none"> they run around 40 checks out of 150 validations they can get around 4k exceptions during day 	<p><i>AI-assisted exceptions</i></p> <ul style="list-style-type: none"> this is a parallel activity that sits alongside the RPA it augments this piece by pointing at anomalies and identifies them as exceptions the AI-assisted exceptions can be eventually integrated into pControl, which can raise such exceptions as "exceptions by AI" or something for the use <p><i>AI-augmented auto clearance of exceptions</i></p> <ul style="list-style-type: none"> AI works alongside (in parallel) with the current procedural auto clearance processes <ol style="list-style-type: none"> pointing at anomalies related to currently identified exceptions finding new ways of automatically clearing the currently identified exceptions fact checking the current procedural auto clearance of exceptions and providing its cognitive results (verified or disproved) <p><i>AI-driven exception clearance</i></p> <ul style="list-style-type: none"> AI replaces the procedural-like auto clearance of exceptions with its own exception clearance
3	market data validation	<p><i>Q: "What if there is a solution that can validate all market data upfront to give clients arguably the most confidence on their market data?"</i></p> <ul style="list-style-type: none"> we can validate all the fundamental data (market data) as real-time events and explain the data exceptions on fund-level <ul style="list-style-type: none"> fundamental, bottom up, data is now routinely validated, top down exceptions are automatically explained in terms of the fundamental data only genuine fundamental data exceptions are highlighted for manual resolution this is about having more confidence about data from providers (not about having less exceptions) <ul style="list-style-type: none"> if clients can be assured that their fundamental data is validated, then if they run the oversight process they can already say with confidence that there is an issue clients do not want to deal with with such problems (spend time on this), but it is important to highlight the issues with TPA data they have and also try to find a way how to solve such issues automatically for them 	<p><i>market data check</i></p> <ul style="list-style-type: none"> we can find discrepancies between prices client have and their TPAs and then go to market (e.g. Bloomberg connection) and get the values to say which one is the correct one <ul style="list-style-type: none"> checking and validating upfront the FX rates, prices, benchmarks (all market data) it can also serve to provide evidence from fundamental data to clear exceptions <ul style="list-style-type: none"> for instance, we know that there was no real issue with security prices if security prices are validated upfront (with such process)
4	systematic analysis	<p><i>Q: "What if systematic issues can be identified and fixed at the source and not introduced to the business processes in pControl including auto clearance?"</i></p> <ul style="list-style-type: none"> systematic issues can cause false positive exceptions fundamental data (market data) and processes coming from the source can make the current validations wrong 	<p><i>recommendation engine for systematic issues</i></p> <ul style="list-style-type: none"> automatic identification, checks, and suggestions for frequent systematic issues (e.g. wrong asset prices) it is able to perform 3 distinct capabilities <ol style="list-style-type: none"> automatic review and suggestions for prices coming into the system <ul style="list-style-type: none"> clients may not need to do as many validations as of now if the right prices are entered to the system currently the client team, which is validating all the the prices before they go into system, is not always putting the right prices in to the system automatic review and suggestion for client journals bookings <ul style="list-style-type: none"> clients may not need to deal with incorrect NAV if they would be booking their journals correctly automatic review and suggestion for processing bonds <ul style="list-style-type: none"> the current processing bonds may not be always correct for instance, the maturity date is not handled correctly and validation should change (validations do not take into account the correct zero values on the day bond matures)

5	validation-onboarding correlation	<p><i>Q: "What if all validations clients need to do can be automatically suggested at their onboarding?"</i></p> <ul style="list-style-type: none"> client raw data are sufficient enough to determine what validations they should run (assumption) currently we have the knowledge about validations, but we are unable to extract it and articulate to clients what data they need (on the fly when meeting them) 	<p><i>recommendation engine for validations</i></p> <ul style="list-style-type: none"> a system enticing clients with relevant suggestions on validations they should run based on their raw data this can be eventually a real-time functionality as they use our product based on choices they make this goes into an area of having knowledge graphs around business processes to know the relationships
6	benchmark comparison	<p><i>Q1: "What if there is a solution that sits alongside the numbers and see how the NAV movement is holding?"</i></p> <p><i>Q2: "What if there is a solution that can quantify the improvement on benchmarking the fund to pinpoint why the fund has moved (a highly desired product feature by clients)?"</i></p> <ul style="list-style-type: none"> we can determine a sub set of benchmarks and weights that best correlate to the fund's performance over different periods of time <ul style="list-style-type: none"> given a fund performance history (i.e. the history of Unit Prices & income distributions, from which the daily and periodic returns can be derived) and a universe of benchmarks with performance history this then enables us to predict within a probability based tolerance (e.g. 95%) the current price based on the current values for the benchmarks 	<p><i>automated benchmark analysis</i></p> <ul style="list-style-type: none"> automatic selection of benchmarks with the appropriate weights to predict a price for the fund <ul style="list-style-type: none"> selecting benchmark candidates (or combo) for attribution analysis (linear regression at start) to look at correlations over the past 60 days (or something else) and using the weight to calculate the next value If the price for the fund is outside of the probability tolerance for the expected price then there is a given probability that there is a problem with the actual price of the fund back testing (should be straightforward) is providing the mechanism for attaching an accurate probability to the actual versus expected <p>The normal way of doing this benchmark comparison is as follows (with the three main types of Fund):</p> <ol style="list-style-type: none"> Passive Fund – tend to be a single Asset Class: Fund Manager supplies a benchmark as the fund is intended to track that benchmark. The only difference should be fees levied & adjustment required when income is distributed Diversified Fund – tend to have Asset Allocation to more than one Asset Class Fund Manager supplies a several benchmarks with fixed weights e.g. 75% US Equities 25% Fixed Income Index Easy to calculate the composite benchmark – and accurate if the fund tracks those benchmarks to those weights Actively Managed Fund – manager picks stocks either within or across Asset Classes Difficult to track fixed weights of multiple benchmarks Therefore allocate stocks in fund to 'correct' benchmark and produce a Daily Stock Level Reweighted Composite Benchmark. <p>So benchmarking of a fund is a bit of an industry in itself – to maintain accurate results the maintenance of the static data required to support 2 and 3 above is considered onerous.</p>
7	process health & timeliness	<p><i>Q1: "What if the output of an AI process can provide an indication of the health and/or timeliness of a set of processes?"</i></p> <p><i>Q2: "What if AI can highlight a situation early on in a process that would require additional resources to complete within SLA time?"</i></p>	<p><i>manual effort estimates</i></p> <ul style="list-style-type: none"> AI is estimating manual effort AI is identifying upfront a certain number of exceptions which can't be automatically cleared and system (pControl) and will require a certain manual input from the client oversight team assuming that this functionality is not available in the current product (pControl) <p><i>process analysis</i></p> <ul style="list-style-type: none"> AI is highlighting outstanding tasks versus time to SLA/ available team members AI is also suggesting (predicting) this for future tasks based on the behavioural data (user and fund)
8	dynamic tolerance levels	<p><i>Q: "What if AI can be used to dynamically update tolerance levels based upon market volatility i.e. benchmarks movements?"</i></p> <ul style="list-style-type: none"> tolerances should get adjusted if there is movement in the market 	<p><i>automatic tolerances</i></p> <ul style="list-style-type: none"> AI is suggesting tolerance levels based on the current market conditions this will ensure that tolerances are breached or ensure that we do not raise exceptions due to current market conditions <ul style="list-style-type: none"> for instance, tolerances on Fixed Income can be quite low and they should be breached if market moved by 5 percent, but they were not breached due to currently "static" (sometimes predefined) tolerance levels (wrong)

9	fund group outliers	<p><i>Q1: "What if AI can be used to highlight any outliers within a fund classification based upon historical correlations with certain data points that change over time?"</i></p> <p><i>Q2: "What if AI can automatically clear exceptions if data movements are within the overall tolerance versus correlation?"</i></p> <ul style="list-style-type: none"> outliers can be pinpointed within a certain fund group as funds are expected to behave consistently if they can be classified into same group groups for funds can be identified via different ways <ul style="list-style-type: none"> funds can be grouped by the same valuation point when we expect them to use the same prices funds can be grouped by looking from top down perspective since they are peers and we expect them to move the same way funds are usually categorised into 4-5 different groups, including peer group, multi asset, and FI funds 	<p><i>found group anomaly detection</i></p> <ul style="list-style-type: none"> funds & classes tend to sit within certain classifications with some common characteristics AI will find this by its own way, e.g. by detecting anomalies across the fund from fundamental data (historical correlations) for the particular fund classification spotting anomalies when data are not applied constantly across the fund <ul style="list-style-type: none"> If fund holds certain asset (currency, forward rates, etc.), which is not consistent across the funds that hold the same fundamental data
10	fund calendar	<p><i>Q1: "What if AI be used to run specific checks on certain dates in the fund calendar (month end or distribution dates)?"</i></p> <p><i>Q2: "What if AI can highlight unusual behaviour when compared to historic patterns at certain dates in the calendar?"</i></p>	<p><i>interactive fund calendar</i></p> <ul style="list-style-type: none"> a fund can have its own calendar showing what suppose to happen on a certain date (new share class, etc.) <ul style="list-style-type: none"> security can have its own calendar holding can having a coupon date or maturity date) clients can expect an outcome on a particular date If they have such calendar
11	advanced reporting	<p><i>Q: "What if there is a reporting functionality supporting the current fund oversight process with analysis on exceptions?"</i></p> <ul style="list-style-type: none"> support team (manager) on client side can look at reasons in particular events this includes trend analysis, reasons for clearing exception, number of validations flared throughout auto clearance vs manually, etc. 	<p><i>Management Information (MI) dashboard</i></p> <ul style="list-style-type: none"> analysis and graphs, e.g. overview on exceptions vs assets
12	market news analysis	<p><i>Q1: "What if there is a solution that can suggest relevant news articles to clients?"</i></p> <ul style="list-style-type: none"> AI can overcome the "herd mentality" and provide more rational (not emotional) independent analysis of news <ul style="list-style-type: none"> for instance, the goal may be similar when everyone checks the particular movement of the stock price that happened the day before, even though they already get it from market data providers (they give us the prices, but we still check if providers got it right) <p><i>Q2: "What if there is a solution that can identify relevant news articles that provides explanations to NAV validations?"</i></p> <ul style="list-style-type: none"> NAV validations can be extended with news articles clients often read market news to gain confidence with their NAV validations <ul style="list-style-type: none"> e.g. price movements 	<p><i>sentiment analysis on market news</i></p> <ul style="list-style-type: none"> news articles are suggested to clients based on their data and interests <ul style="list-style-type: none"> this is not a "random" list of news in particular market segment sentiment analysis can be a good starting point to implement such functionality this product feature may be part of a new product with different UX approach (not a pControl) to ensure we deliver the right user experience
13	automated narratives	<p><i>Q: "What if NAV movement can be automatically described in a narrative text form?"</i></p> <ul style="list-style-type: none"> describing the situation and related processes via automatic text generation provide commentary in the form of some text explanation after the exception is cleared (or process is validated) <ul style="list-style-type: none"> for instance, provide descriptions on how NAV is moving (perhaps we checked the corporate actions to explain the movement if the price was not correct / no match) fund managers can have 2 levels of automated narratives, which they may get from TPAs (they have to provide them with some explanations) <ul style="list-style-type: none"> fund level exception level 	<p><i>automated commentary</i></p> <ul style="list-style-type: none"> NAV movement commentary is automatically generated and in an appropriate format it can be provided across all funds, not just for those that have exceptions (not explaining exceptions only) <ul style="list-style-type: none"> providing a general description about the fund, e.g. saying that fund moves by X <p><i>automated narratives</i></p> <ul style="list-style-type: none"> covering the whole subject and with opinions for instance, describing the the overall market theme and not just one aspect of NAV movement
14	cognitive workflows	<p><i>Q1: "What if the manual clearance of true positive exceptions by human can be simulated by machine?"</i></p> <ul style="list-style-type: none"> agent-based cognitive workflows where software agents are modelling the cognitive processes involved in human cognition around work processes agents can examine exceptions, make suggestions and decisions, and assist with the speed of getting to resolution of exception (identifying exceptions is already quick enough) <p><i>Q2: "What if there is a solution that can find a different pathway with data-driven techniques to currently rule-driven techniques?"</i></p>	<p><i>AI-highlighted processes</i></p> <ul style="list-style-type: none"> AI proposing a level of confidence for rule-based exceptions to notify the user for instance, giving users a high level of confidence (over 90%) that some exceptions do not need to be looked at or vice versa

		<ul style="list-style-type: none">• AI can give us different values or ways doing the current processes (not using traditional algorithms)<ul style="list-style-type: none">• we have already proved with new tech (pControl) that traditional fund accounting does not need to be involved in NAV validations• now, we can do it again with the help of AI• AI can spot the process distortion<ul style="list-style-type: none">• perhaps use AI to look at cash flow, trading signals, and pointing something that distorted a primary process	<i>AI-assisted workflow</i> <ul style="list-style-type: none">• AI running in a 'silent' mode (background) while the users is clearing an exception and notifying users about their actions they are about to make• for instance, highlighting that their actions are right (or wrong) and giving an opinion around the new piece of data entering the process
			<i>virtual assistant</i> <ul style="list-style-type: none">• AI is driving the identification of all problems and anomalies (all true exceptions are anomalies), does not miss exceptions and looks at the risk piece to helps us identify where are, suggests solutions to all problems, and provides us with descriptions on processes (e.g. how NAV is moving)