The Meaning of Portfolio Intelligence:

Why Data Automation and Cloud-Based Technology Will Define the Future of Investing





n a world where accessing data and information has never been easier, intelligence is rapidly becoming a nebulous concept. It may be hard to define, but we know it when we see it—or do we?

Having a reason for making a particular asset allocation is one thing. Determining whether that reasoning had anything to do with the outcome is quite another. If a given fund outperforms and strengthens an asset owner's portfolio, but the forces that led to the returns are unclear, that's not intelligence—it's simply happenstance. If a fund manager heads into a sales meeting ready to cite statistics on portfolio performance, but without insight into what factors were most

Data is the lifeblood of our industry, offering countless avenues for analysis. However, the volume and complexity of our data means the approaches that are so effective in delivering intelligence to other sectors are not adequate.

consequential to that performance, that's a missed opportunity to promote the business. At SEI Novus, we believe the true meaning of intelligence is the ability to see things that others don't and make decisions that are informed by the past and the present.

This is a key priority for organizations of all stripes: a 2021 report from Mordor Intelligence projected that the business intelligence market will surpass \$40 billion in value by 2026, up from around \$20 billion today. But this tremendous growth has not yet extended to the investing space. It's a paradox: data is the lifeblood of institutional investing, offering countless avenues for analysis. However, the volume and complexity of our data means the approaches that are so effective in delivering intelligence to other sectors are not adequate.

For asset owners and fund managers that need a deeper understanding of what decisions are most impactful to their success, the solution must go deeper, incorporating specialized analytics and mathematics that would be overkill in other industries. For asset owners, that requires the ability to manage large quantities of data, ingesting multiple reporting documents and data from a wide range of managers across diverse asset classes. For managers, it means leveraging new datapoints to inform their clients, scale reporting functions, and refine sales and marketing.

At SEI Novus, this gap in the marketplace led us to pioneer a one-stop shop for what we call portfolio intelligence—essentially, a set of processes and functionalities that help institutional investors get smarter about gathering, organizing, and analyzing data to make the right decisions. This is a key part of our mission to create a true intelligence ecosystem, in which asset owners and managers can streamline the production and exchange of information and insights, see how they stack up against the competition, and use this information to optimize their business.

portfolio intelligence noun /port-'fō-lē-,ō in-'te-lə-jən(t)s/

- 1 INVESTING The state of knowing and understanding a portfolio; such that decisions are made with clarity and confidence.
- 2 INVESTING When all systems related to portfolio data are synchronized, operating at peak efficiency, and contributing to a singular, defined outcome (which may be delegated across workflows).
- **3 INVESTING** The ongoing process of historical analysis informing daily decision making.
- **4 INVESTING** Simplifying the technical complexity associated with managing a portfolio, such that insights are easily gleaned.

Cutting through the noise that exists in this space is no small undertaking, but it is necessary for asset owners and managers to navigate a shifting investment landscape with knowledge and efficiency—and it all starts with making sure the data and technology are up to the task.

A Deluge of Data

Making sense of a portfolio begins with making sense of investment data. The problem is that the markets today require investors to have more of it than ever before. New types of data (such as ESG and alternative data) and growing adoption of non-traditional asset classes (such as digital assets and private equity) mean that asset owners and managers must ingest growing and diverse volumes to remain competitive. This data—and the systems that house and query it—must be clean and easy to use. Firms must integrate and attach this data to their portfolios using their own individual taxonomies and language standards, a tedious, time-consuming process that requires a lot of technology spend to implement.

Increasing manager transparency is another trend that is making this space more complex. Thanks to a confluence of factors, including the maturation of the sharing economy and shrinking costs, providing position-level transparency costs a quarter of what it did less than 10 years ago; managers are delivering higher quantities and diversified types of disclosures to their asset owner clients, and they're doing so much more frequently.

Keeping up with Manager-Provided Data

Asset owners face unique challenges when it comes to managing the diverse datasets in their portfolios. Consider for example:



RECEIVING 20 DATA POINTS PER MONTH FROM EACH MANAGER

This creates additional obligations that can quickly spiral out of control. Let's say an asset owner investing into 14 managers receives 20 data points per month from each for a total of 280 data points monthly. Moving to position-level transparency could mean receiving data on 100 positions per firm per month, each with several attributes like PnL, market value, and the like. Now we're talking about thousands or even tens of thousands of data points. Somewhere along the line, manual processes and outdated workflows collapse under the pressure.

Issues with custody providers cause another headwind. This space has consolidated significantly over the years, but only rarely were these systems properly integrated with one another, leading to chaotic mergers. The result has been a long track record of inaccuracy and tardiness when it comes to tracking what is going in and out of a client's portfolio, to the point of asset owners and managers spinning up their own shadow accounting practices, expending additional resources. Ultimately, custodians are paid to house assets, not provide good data, and their clients are forced to compensate for this reality.

Given these challenges, the ability to ingest, validate, and enrich large quantities of investment data is crucial to deriving portfolio intelligence.

The Pitfalls of DIY

Once their data challenges are solved, firms can start thinking about how to go about deriving intelligence. It might be tempting to build an in-house solution—it's so much sensitive information, why would anyone want to give up control?—but in reality, this kind of insistence on DIY technology is holding the industry back.

Many firms have built their own teams of data scientists who leverage modern capabilities for this analysis: Python, R, MATLAB, and others. But as sophisticated as these languages might be, and as impressive as the people involved undoubtedly are, they essentially amount to glorified Excel—that is, they are unscalable systems run by humans, with all the inherent room for error and manual workflows.

According to our research, for managers in the broad range between \$50 million and \$50 billion in AUM, building and maintaining a DIY portfolio intelligence system will require an average of 2.7 full-time employees and costs approximately \$50,000 per year in software expenses, such as data lakes, coding engines, SQL servers, and outsourced IT consultants. All told, this amounts to a one-off cost of \$2 million

The Do-It-Yourself Trap

An average in-house portfolio intelligence build consumes \$2 mn in setup costs alone.

full-time employees
focused on data maintenance

\$50K per year in software expenses

3.2+ years

until the in-house system is satisfactory

and yearly maintenance costs of around \$750,000. For that kind of money, firms can pay a portfolio intelligence provider for a decade or longer for a solution that will be ready in mere days or weeks.

In addition to financial costs, firms must consider the cost of time. The typical DIY build takes an average of 3.2 years, and with the average tenure of an investment professional aged 28-34 being 2.8 years, some amount of turnover is inevitable, further delaying the timeline. To top it off, these internal systems are usually local, so they lack features like fast computation and curated data sources. Although this apporach clearly demands an incredible amount of effort, the outcome is insufficient; it's a half measure.



Endogenous vs. Exogenous Alpha Generation for Managers

Andrea Gentilini, Head of SEI Novus

"There are two schools of thought regarding our industry. One is that alpha still exists in the market, and those with the greatest investment acumen are best able to capture it. The other is that the opportunities to generate alpha have declined drastically over the years due to how fast information travels and gets absorbed by market participants. Our data provides evidence supporting the latter school of thought.

"If you trust the evidence, it means we're getting closer to what the efficient market hypothesis proposes: at any given moment in a highly liquid market, security prices reflect all available information, leaving little to no room for alpha generation. We agree with the evidence and its conclusion, but only in regard to exogenous alpha sources (i.e., opportunities that are associated with pricing inefficiencies due to information asymmetry related to securities).

"The study of behavioral finance suggests there are other, endogenous sources of alpha. These reflect the fact that investors are not rational beings and have psychological influences and biases that affect their investment decisions. Our assessment is that opportunities for endogenous alpha are still abundant!

"The bottom line is that today, data moves too quickly for firms to gain an advantage on their competition. To improve investment performance, the best path forward is to analyze your investment process through the data you have produced, extract insights on what you can do better, and iterate on them until they materialize in higher performance."

Instead, the optimal approach is in the cloud, which enables automated processes, customizable dashboards, and the ability to view analytics in dynamic formats as opposed to static PDFs. This is the only way to effectively approach technology in the modern world, but standing up their own cloud-based platforms is a non-starter for most firms in this space. To derive true portfolio intelligence, the only remaining option is to work with expert partners who are purpose-built to ingest and analyze high volumes of data using a cutting-edge technology stack. This way, asset owners and managers are free to focus on the craft of investing (and generating alpha).

Portfolio Intelligence Creates Unprecedented Opportunity

Solving these data and technology challenges is a crucial prerequisite for portfolio intelligence—indeed, these are the pillars that support SEI Novus' ability to help clients derive insights from complex datasets. Armed with a clean, well-designed tool that can be used for their whole portfolio management needs, clients can understand the true reconciliation of the performance and valuations.

Ultimately, the concept of portfolio intelligence should influence investors to move from an outcome-centric mindset to one focused on the process. There is a similar status quo in sports. When a quarterback makes a game-winning touchdown pass to a receiver in double coverage, we simply marvel at the amazing play—we don't care that there may have been three other receivers who had a better chance to catch the ball. But over the course of their careers, a quarterback who makes the optimal play every time will have better stats than one who flings the ball around according to his inclinations, even if the latter has his share of highlight reel moments. To be clear, favorable outcomes remain the ultimate goal. That said, the outcomes alone do not offer any usable insight on how to achieve them; rather, the process is where the insight lies. To achieve sustainable success, we should focus not on what occurred in a single instance, but on what will lead to the greatest chance of success over many trials, whether it's in choosing a fund or going for the end zone.

When implemented correctly, the benefits of portfolio intelligence are myriad. Here are just a few:

- 1. Better outcomes. Insight into a decision-making process leads to better decisions and better outcomes. In our industry, better outcomes mean more money for beneficiaries (be they retirees, grant recipients, or scholarship recipients). And mind you, these better outcomes are also more intentional; they can be backed up by clear reasoning, helping clients and counterparties understand the work and expertise that go into them.
- 2. Better governance. More data means more opportunities to ensure an agent is "behaving." This is especially true for asset owners who are delegating investment decisions to asset managers.

3. Better working experiences. With portfolio intelligence, investors have the luxury of focusing on finding insights and acting upon them—the ultimate driver of intellectual stimulation and outsized returns in our craft—rather than doing VLOOKUPs in Excels, running SQL queries, or troubleshooting data issues.

Let's face it: no manager wants to report to an asset owner that they've lost money. In this situation, transparency may sound scary. In reality, transparency is liberating. At SEI Novus, we observe that sophisticated investors enter into long-term relationships with managers with the understanding that performance may wax and wane, so long as the investment *process* remains relatively stable—less the portfolio fine-tuning previously mentioned. How can a manager and asset owner possibly have such a crucial conversation without true portfolio intelligence?

With the right approach to portfolio intelligence, asset owners can see what others may be overlooking and gain a level of insight and efficiency that can transform their business now and in the future. Meanwhile, managers can identify their strengths and weaknesses, streamline both internal and regulatory reporting, and hone sales and marketing functions based on their core competencies. Overall, greater intelligence on both sides of the asset owner-manager relationship will foster an environment in which process and precision are paramount, which is great news for everyone involved in the markets—from the institutions that define them to the humans who invest in them.

Inside SEI Novus

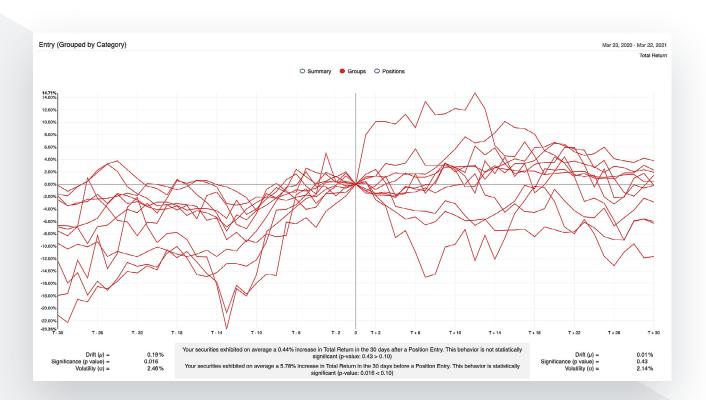
Here's how a few investors who have embraced portfolio intelligence are gaining insight and improving their processes.



MANAGED ACCOUNT PLATFORM

Event Analysis

A pioneer in providing investors with access to hedge fund strategies via managed accounts, LGT has been working with SEI Novus to manage analytics across 50 managers totaling \$4 bn in AUM since 2015. With Event Analysis, LGT users check if managers are good at timing—they can assess whether a manager is entering or exiting position too late or early, as well as testing for other behavioral investment biases. Through statistical testing embedded into the features, users can distinguish the signal from the noise.

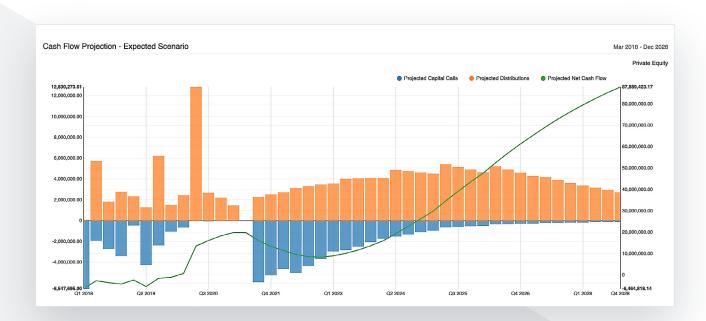




ENDOWMENT

Cashflow Projections

Tribus manages high-transparency, multi-asset portfolios spanning public and private assets. Through SEI Novus, Tribus consolidated front-office technology into one platform, making more of available transparency, while receiving rigorous validation on sensitive performance calculations. With Cashflow Projections, users assign fund-specific models to each investment and roll up estimates at portfolio level across all funds to inspect capital calls, distributions, and NAV. Through SEI Novus, users can create best- and worst-case scenarios, and prepare for different possible liquidity outcomes.





MULTI-FAMILY OFFICE

Best Available

Brandywine manages investment mandates of high-profile families, with complex portfolios across public and private equity. Using SEI Novus, Brandywine aggregates exposures via the Best-Available transparency, automating both investment committee reporting and manager due-diligence process. Through sophisticated data management automated by SEI Novus, Brandywine consumes manager dashboards combining different transparency levels (private / public data, position / exposure) with company fundamentals. These data inform rebalancing decisions, compressing days of work into minutes.

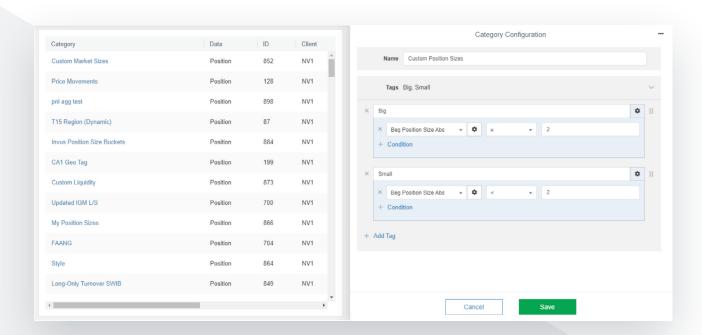
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Position	Sector Tag	Pos Size (%) ▼	QTD (%)	YTD (%)	2018 (%)	QTD Cont (%)	YTD Cont (%)	TTM P/E	P/E 5y Avg.	P/B	P/S	EV/ EBITDA	D/EBITDA
TransDigm Group Inc	Industrials	19.3	13.9	62.0	23.8	3.2	12.9	114.7	25.7	(9.6)	5.3	18.6	7.1
Amazon.com Inc	Consumer Discretionary	10.6	(8.3)	15.6	28.4	(0.7)	1.2	262.1	158.2	15.2	3.2	35.8	1.6
Booking Holdings Inc	Consumer Discretionary	10.0	4.7	13.9	(0.9)	0.4	1.3	66.6	29.6	14.0	5.6	14.7	1.5
MPLX LP	Energy	9.3	(11.0)	(1.6)	(8.4)	(1.2)	(0.2)	39.7	31.4	1.7	3.5	16.8	4.4
Guidewire Software Inc	Information Technology	8.5	3.9	31.3	8.0	0.3	2.1	1,446.4	(66.9)	5.5	12.0	182.1	7.7
RealPage Inc	Information Technology	6.1	6.8	30.4	8.8	0.5	2.3	454.3	812.3	5.1	6.1	34.2	3.2
Liberty Broadband Corp	Communication Services	6.0	0.4	45.3	(15.4)	0.0	1.6	1,643.2	185.1	1.8	1,31	(1,100.9)	(29.5)
Charter Communications Inc	Communication Services	5.5	4.3	44.6	(15.2)	0.3	2.7	252.9	(5.4)	2.8	2.0	11.1	4.4
Constellation Software Inc	Information Technology	4.4	6.3	61.4	6.0	0.3	2.6	172.9	52.4	34.6	6.3	27.7	0.4
Advanced Drainage Systems Inc	Industrials	3.6	(1.3)	39.0	2.8	(0.1)	1.2	(37.7)	(9.8)	4.4	1.5	17.3	1.3
STARTER POSITION A	Not Available	2.2	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	-	
Equinix Inc	Real Estate	2.2	14.9	66.1	(20.4)	0.3	0.8	344.1	53.9	5.6	9.0	26.8	4.9
SBA Communications Corp	Real Estate	2.2	7.4	49.2	(0.9)	0.0	1.2	2,026.5	(432.2)	(7.4)	12.9	29.9	7.2
Visa Inc	Information Technology	2.1	(0.7)	31.0	16.5	0.1	1.5	110.3	33.0	12.8	17.0	26.9	1.2
Ashtead Group PLC	Industrials	1.8	2.1	41.1	(16.6)	0.0	0.1	42.1	12.1	3.4	2.1	7.0	1.8
Tyler Technologies Inc.	Information Technology	1.5	21.5	41.3	5.0	0.3	1.2	238.7	52.9	6.3	8.9	38.7	0.0
Nord Anglia Education Inc	Consumer Discretionary	0.9	0.0	0.0	0.0	0.0	0.0	0.0	57.3	0.0	0.0	-	
Sarana Menara Nusantara Tbk	Communication Services	0.8	(7.1)	(2.8)	(10.1)	(0.1)	0.0	55.3	25.9	4.0	5.4	9.9	2.0
Verisign Inc	Information Technology	0.5	(9.8)	27.2	29.6	0.0	0.0	133.5	37.1	(16.7)	19.3	27.3	2.2



HEDGE FUND

Dynamic Tags

With about \$500 mn in AUM, IGM is a global equity long / short and opportunistic credit strategy fund. With SEI Novus, IGM creates a bespoke experience for analyzing its asset class allocations and performance. IGM analyzes its data with the same lens that its investors view the industry. With dynamic tags, users can configure their own rules on how to automatically label all portfolio positions, thus multiplying the analytical dimensions available (including the split of core vs. hedging portfolio) for exposure, attribution, and risk analyses.

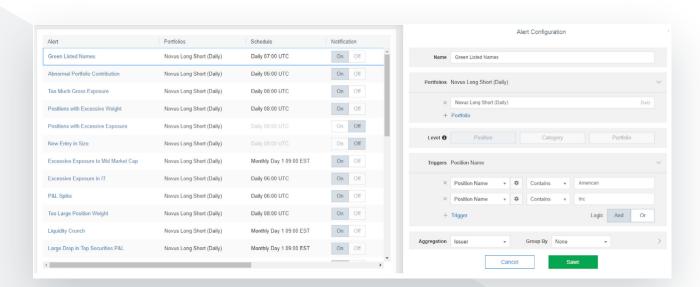




MULTI-MANAGER PLATFORM

Alerts

With an AUM exceeding \$55 bn, GCM Grosvenor is one of the largest independent alternative asset management firms in the world. GCM uses SEI Novus for granular due diligence analytics and monitoring / analysis of the investment talent in its multi-manager platform. Through Alerts, GCM tracks portfolios to ensure they stay within agreed investment guidelines and appropriately manage risk. Alerts are set up once and flexibly deployed to multiple portfolios in parallel, shared among team members, linked to custom notification settings, and audited over time.

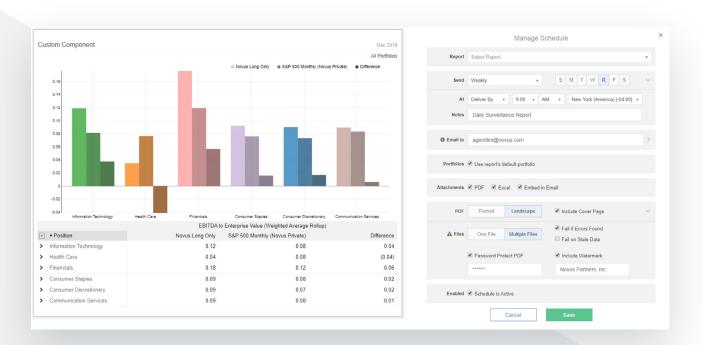




FUND OF FUND

Custom Reporting

Private Advisors grew into one of the largest private asset managers throughout its 20 years history across Private Equity, Real Assets, and Long / Short Equity. It leverages SEI Novus to extract insights for decision making around their separate managed accounts (SMA) platform. Through tailored, automatically-generated reports covering a pre-configured lookback period hitting inboxes early in the morning, Private Advisors spots significant trends affecting manager portfolios, facilitating a deeper, insights-based dialogue with investment teams around skill set and optimal portfolio positioning.

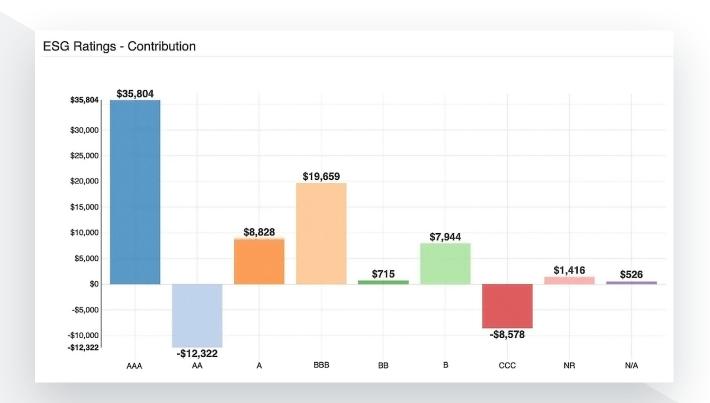




ALTERNATIVE ASSET MANAGER

ESG Analytics

Cheyne Capital specializes in investments across Real Estate, Corporate Credit, Equity, and Convertible Bonds. By ingesting large portfolios across multiple asset classes, SEI Novus facilitated the discovery of unprecedented insights into its skill-set and unique position-level ESG reporting. Cheyne Capital leverages The Novus Platform to implement its ESG policy, managing exclusion lists and monitoring the evolution of their investments through ESG lenses. Through SEI Novus, Cheyne has its positions tagged by ESG score every day, allowing for seamless attribution, risk, and exposure analyses.





ABOUT SEI NOVUS

SEI Novus is a portfolio intelligence platform where asset owners and asset managers interact with their investments and with each other. Investors can access best-in-class solutions to enrich and manage their data, extract actionable investment insights, and improve stakeholder communication via visualization and automation.

All investment types—liquid and illiquid—are supported. Accessibility to sophisticated portfolio management, aggregation, and analytics is unmatched. Communication between stakeholders is made seamless. With simple data workflows and newfound data-driven insights, clients have the utmost confidence in their investment decisions.

More than a decade ago, SEI Novus invented the art of portfolio intelligence and now supports clients with a total AUM over \$4 trillion from 4 offices around the world. With SEI Novus, investors succeed.

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