SAA Implementation

Arizona State Retirement System

September 28, 2018

Outline

1. Implementation Plans

2. New Back Office

3. Return Calculation Methods

4. Quality Control Systems

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1. **Implementation Plans**

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Implementation Plan Status

SAA Implementation Tasks	To Do	In progress	Completed
Plan the alpha transport trade	X		
New daily tactical positioning report	X		
New approach to attribution analysis	X		
Add compliance measures and checks for SAAP requirements	X		
Organize private portfolios	X		
Credit facilities	X		
Treasury operations	X		
Update Reports to fit new SAAP		X	
Prepare first implementation plans for each asset class		X	
Set up securities lending by asset source		X	
Linking private investments funds and performance to new asset class layout		X	
July 1 positioning			X
Notify new SAAP and dependencies			X
Reallocate Commodities and Bridgwater to "Other"			X
Reallocate Private debt, opportunistic debt and high yield to "Credit"			X
Reallocate credit and interest rate sensitive toll up to "Total Fixed Income"			X
Reallocate farmland and infrastructure to "Real Estate"			X
Private equity rolls up to domestic equity			X
Opportunistic public equity rolls up to domestic equity			X
Opportunistic Private Equity split to equity and real estate component			X
Credit Portfolio Manager to provide structure for fixed income			X
Equities Portfolio Managers to provide structure for equities and real estate			X
Setup 2 new accounts at SS for tactical and distressed debt			X
Restructure fund info for AIS to transfer funds to new categories and add new attributes			X
Implement new portfolio benchmarks			X

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Background

- In January 2018, we engaged with State Street to incorporate additional services to create a needed middle office function.

- ASRS was using State Streets' "Core" service model previously and outgrew the "Core" model.

- The "Enhanced Asset Owner Services" (EAOS), brings a focused State Street team for both accounting and performance, transaction management services and the inclusion of an Investment Book of Record (IBOR).

- Benefits include:
  - Process guidelines and delivery expectations
  - Improved operational workflow
  - Transaction management for trading (validation, confimation, settlement and failed trade management)
  - Streamlined investment data with 40 Act compliant data

Progress and Timeline

Arizona State Retirement System

EAOS Conversion Project | Status Update
Report Period: Week of September 10, 2018

Overall Status	Current	Previous
Project Objective:	Ensure orderly transition of ASRS service levels from legacy STT operating model to EAOS operating model by respective workstream live dates	
Status Description:	On Track	Review ASRS feedback on MO SLA and contract / perform interim MO readiness tasks / prepare for Sept 19 SLA based ASRA on-site	

Progress Since Last Period	Upcoming Activities	Workstream	Target Completion	Current Status	Prior Status	Summary Status Description
Client Service: • SLA review meetings ongoing *Performance:* • Completion date pushed to 9/30 *Middle Office:* • Continue working on MO SLA/contract *CSG Best Practice Review:* • Will revisit in late Sept	*Client Service:* • Section 4 Review set for 9/19 *Performance:* • Continue enhanced data qc tasks *Middle Office:* • Follow-up contract/SLA talks / perform readiness tasks *CSG Best Practice Review:* • Will revisit in late Sept	1. Project Management	2/28/18	C	C	Project mgmt. is ongoing
		2. Contracts & Fee Sched.	9/30/18	G	G	Assess contract(s) w/ASRS
		3. CS: SLA & KPIs	11/30/18	G	G	Date moved to 11/30
		4. CS: Service Transfer	4/30/18	C	C	
		5. Acctg: Service Transfer	5/1/18	C	C	
		6. Perf. & Analytics	9/30/18	G	G	Targeting 9/30 compl. date
		7. Transaction Mgmt.	11/30/18	G	G	Pending contract negotiations
		8. IBOR Prime	1/31/19	G	G	Pending contract negotiations
		9. CSG Best Practice Rvw.	Pending	G	G	Postpone until late Sept

Issues/Risks					Completed Milestones/Significant Tasks
Description	**Owner**	**Status**	**Target Resolution**		3/12: Signed/Executed Amendment 17
					3/26: New EAOS accounting team resource hired
					4/30: Client Service transfer complete
					5/1: Accounting service transfer complete
					6/13: Completed first month-end close
					6/20: Interactive Spreadsheet issue resolved

G Low Criticality/Priority, On Target   A Medium Criticality/Priority, Delivery Tracking Late   R High Criticality/Priority, Late Delivery   C Complete   ↑ Overall status improved since last week   → No change since last week   ↓ Overall status declined since last week

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Performance Book of Record

- Effective July 1, 2018, SSBT will be the peformance book of record for ASRS
- All available data will be incorporated into the daily return calculation
  - Private Market returns have historically been included in the Total Fund return on the last day of the quarter (i.e. 6/30/18)
  - This causes a significant delay in reporting Total Fund returns
  - It also understates returns during the off quarter months and overstates returns during the quarter end month
  - Daily cash flows will no longer be weighted by the days in the month when calculating the monthly return

SSBT Total Fund Return Calculation

- Definitions
  - Market Value (MV) equals share positions multiplied by price plus receivables (at market) minus liabilities (at market)
    - Private Markets gain/loss will be incorporated on the day received by SSBT Accounting from Private Edge
  - Average balance (ABAL) equals the beginning market value plus net cash flows
  - Dollar Value Added (DVA) equals daily gain (or loss) plus income
- Portfolio Daily Performance: $R_{Daily} = DVA/ABAL$
- Multi Period Returns:
  $R_{multi-period} = ((1 + R_{Daily1}) * (1 + R_{Daily2}) * \ldots (1 + R_n)) - 1$
- Market values and cash flows will be summed from the underlying accounts (i.e. all accounts sum to Total Fund) to calculate the return as above

Benchmark Changes

- Effective 7/1/2018, the benchmark methodology changed across all benchmarks to be daily linked returns to calculate monthly returns
  - Prior to 7/1/2018 benchmarks were re-calculated at month end (component weight x component return)
- Lagged Benchmark Methodology
  - For Private Equity (MSCI ACWI IMI w/USA Gross (Net) Lagged) and Credit benchmarks (S&P Leveraged Loan Index Lagged + 250bps), the daily returns are calculated by taking the monthly return from three months ago, and geometrically de-linking, so that there is a constant daily return regardless of the days in each month
    - Delinking methodology: $R_{Daily} = (1 + R_{Monthly})^{1/n} - 1$
    - n = number of business days in month
  - Real Estate benchmark is geometrically de-linked across the remaining days in the quarter once the lagged return is received

Futures Impact on Returns

- Currently, the futures performance in the cash assetization account are retained within the account irrespective of what the underlying exposure is
- The methodology detailed below adjusts the returns of the composites that have futures exposure in cash assetization as if it is an *unlevered* position (example details an S&P 500 exposure)
  - US Large Cap composite adjustments
    - Notional value of the futures position is added to beginning and ending market values
    - Profit/ loss is added to the ending market value
    - An interest on the notional amount is calculated and added to the ending market value
    - Return calculated normally
  - Cash assetization adjustments
    - Notional value of the futures position is subtracted from the beginning and ending market values
    - Profit/ loss is subtracted from the ending market value
    - An interest on the notional amount is calculated and subtracted from the ending market value
    - Return calculated normally
  - Total Fund return would not change as the sum of the beginning and ending market values are equivalent to prior to the adjustments above

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Quality Control

- IMD is instituting a daily reconciliation procedure to:
    - Ensure that the ASRS Database mirrors the new ESS custodial bank records with no tolerance for variance.
    - Verify Total Fund and all portfolio composites from a 'top-down' perspective by aggregating net asset values and cash flows at the underlying account level and calculating performance.
    - Corroborate that the total fund return calculation from the composite level matches 'top-down' performance.
    - Generate automated daily exception reports to reconcile any differences in net asset values, cash flows and performance calculations during the month, well in advance of the monthly close.