Example of an Enterprise Architecture Design for Base & Target Architecture

- This is an example of a real project I worked on called ‘Segregated Fund Modernization’. I produced the whole document with some minor input from other stakeholders.
- The document is a recreation of the original from memory, not the document itself.
- The document uses the client’s standard EA template but was enhanced by myself with numerous sub-sections, primarily in the Overview section
- The purpose of the document is to give anybody reading it a detailed business understanding of the E2E segregated fund management process as well as architectural overview of the systems participating in the process.

Table of Contents

Initiative Overview

Initiative Description

The purpose of this initiative is to modernize and rationalize the Investment Finance organization's technology implementation in order to reduce technology and business risk, reduce application footprint, and optimize business process.

The recommendation is centred around re-implementing Investment Finance business capabilities onto the Temenos Multifonds Global Accounting (MFGA) platform and the surrounding Investments Division Integration Area referred (IIA).

We observed in early analysis that ~75% of the Investment Retirement Funds Interface (IRFI) functions can be met in part or in whole by MFGA. For the remaining 25% of the gaps observed, Temenos will build a new 'Asset Allocation' (AA) module within MFGA, or enhance MFGA as appropriate, or we augment in IIA.

At conclusion of this initiative, MFGA will be our strategic platform for all aspects of Fund Accounting and IRFI will be decommissioned.

Business Unit	Investments
Business Sponsor	
Enterprise Architect	
Portfolio Architect	
Project Architects	
Delivery Lead	
Tech Triage Date	*MM-DD-YYYY*
Project Level	L1
Governance	ARC/Local/Endorsed
Timeline	Q# FY*YY* – Q# FY*YY*

Budget

Infrastructure	$$$
Licensing	$$$
Vendor	$$$
IT	$$$
Other	$$$
Total	$20 mil

Business Goals

1. Rationalize Investment Finance functions and technology implementation by consolidating onto MFGA via MFGA enhancements, including building a new 'Asset Allocation' module
2. Optimize and improve Investment Finance business processes
3. Determine Target Operating Model for business capabilities

Technology Goals

- The Investment Finance system is comprised of tightly coupled technology and business processes with business (processes) and technology (platform, frameworks, skills) risks
- The Investment Finance technology implementation revolves around the GWL mainframe system IRFI and manual workflows and spreadsheets
- Just replacing IRFI technology is not enough, must consider entire Investment Finance implementation (process, workflow, technology implementations, integration, organizational change...)

Background Information

Segregated funds is one of the core business segments for CL

What are a segregated funds?

Segregated funds are individual variable insurance contracts (IVIC) that offer guarantees and are issued under The Insurance Act. They are segregated from the insurance company's other investments to protect the investors. Segregated funds are structured using virtual shares (“notional units”) versus for example, true units of ownership in a mutual fund.

- Seg fund assets under administration: ~$95B
- Funds: ~1,000
- Cash movement: $10Ms - $100Ms daily in and out of system
- $350M pretax income annually
- 22% Canada earnings

Below is a generalized view of the segregated fund ecosystem, end to end.

Over the years the business has developed sophisticated investment strategies in terms of virtual funds (funds not backed by a custodial arrangement) and asset mixing

The business created its own system (IRFI) where it could implement these ideas, and this system organically evolved together with the operational support it needed

This has resulted in the current state where ‘fund asset management’ and ‘fund accounting’ are distributed across multiple teams and platforms even though they are overlapping in business functionality.

While the initiative started with a directive to separate the business logic from the IRFI implementation as well the manual operational tasks in asset management, there tends to be a recurring theme of focusing the project on the technology rather than the core business process optimization

This results in the perception of the project being primarily an IRFI migration to Multifonds. However, business operations process review remains in scope at this time

Architecture Vision

Single System for Segregated Fund Accounting.

Ultimately there should only be a single system that performs segregated fund accounting regardless of fund manufacturing origin (this explicitly excludes our mutual fund shelf). Make Temenos Multifonds Global Accounting that system and centre Investment Finance capability on it

Modernized Operational Support and Reporting.

All current operational support tasks and reporting which have evolved within IRFI will need to be uncovered, documented and modernized to fit the new system

Automated Tasks.

The manual tasks should be automated as much as possible, but the business needs to decide which manual tasks to retain to allow for proper oversight and control of the business process

Benefits

Rationalizing the Investment Finance technology implementation onto Multifonds will pave the way for several other business benefits in the future including:

- Allow both individual and group customers currently invested in legacy funds (GWL, LL) to access a refreshed Canada Life fund shelf as part of a larger effort to consolidate, stream-line and rationalize segregated fund product offering.
- Support consolidated future institutional and real estate funds ($5.1B1 IO business).
- Enable merger and amalgamation of similar funds that will reduce operational costs

In addition, significant IT infrastructure benefits will be realized:

- Enable GP36 to GPAS migration/consolidation and related benefits (reduced footprint, decreased operational costs, etc.)
- Reduce the critical legacy system risk due to aging platforms and loss of valuable SMEs
- Improve maintainability, scalability and extensibility of the systems
- Provide flexibility to better accommodate future Wealth product needs on a single platform in a competitive and evolving marketplace
- Reduce the complexities, cost and risk of continuing to develop in a mainframe environment

All these benefits are in-line with the strategic direction of the company: increase revenue, decrease costs, improve retention.

Project Mandate & Key Principles

Project Mandate

Consolidate all fund accounting functionality for segregated funds in a single system (Temenos Multifonds Global Accounting)

This part has only limited coverage in this document since it's primarily covered in the BSA artifacts including BRDs and FSDs

Make Multifonds data the BoR & the distribution hub of this data for other internal systems

This part is the primary focus of this document because the vendor will not be recreating the interfaces and hence this must be done internally

Make Multifonds the reporting tool and its data the reporting source for all segregated fund reporting needs

Reporting will be covered in a separate BRD and not in this document

Optimize the current operational workflows to fit the new system environment

Any change in the operational processes will be covered in this document in later iterations

Migrate data from IRFI to Multifonds. As part of the migration explore creating a permanent enterprise BoR for segregated fund products which currently doesn't exist.

Key Principles

Modernize

- Improve and modernize since it is one of the non-functional goals of the project to modernize the Investments IT infrastructure

Business Value

- But modernize judiciously where it make sense and where there is a functional or non-functional tangible benefit, *i.e.* don't modernize for the sake of modernization.

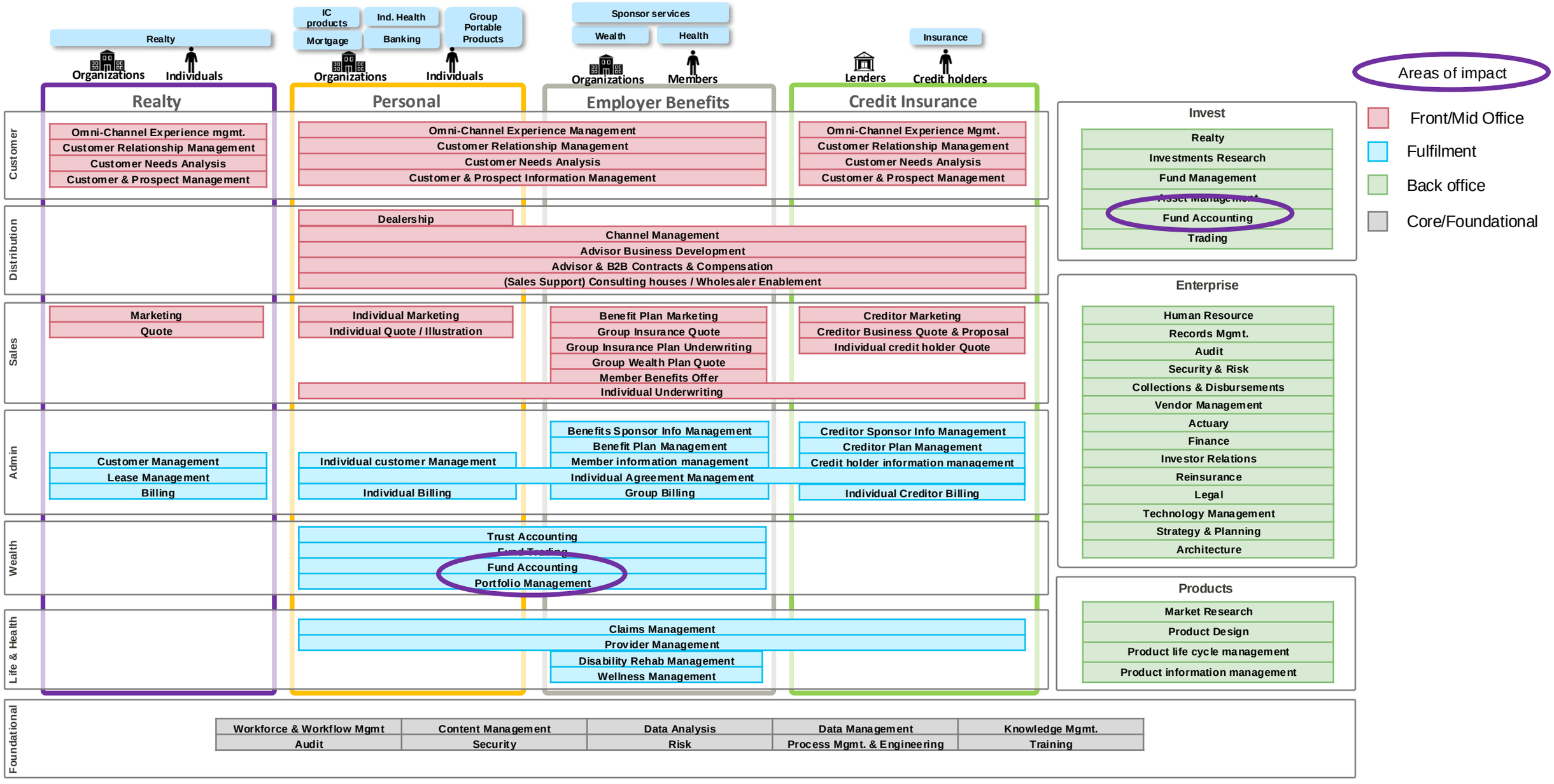
Risk

- Be mindful of increased risk due to using new patterns and technologies. Take risk commensurate with the constraints of the project.

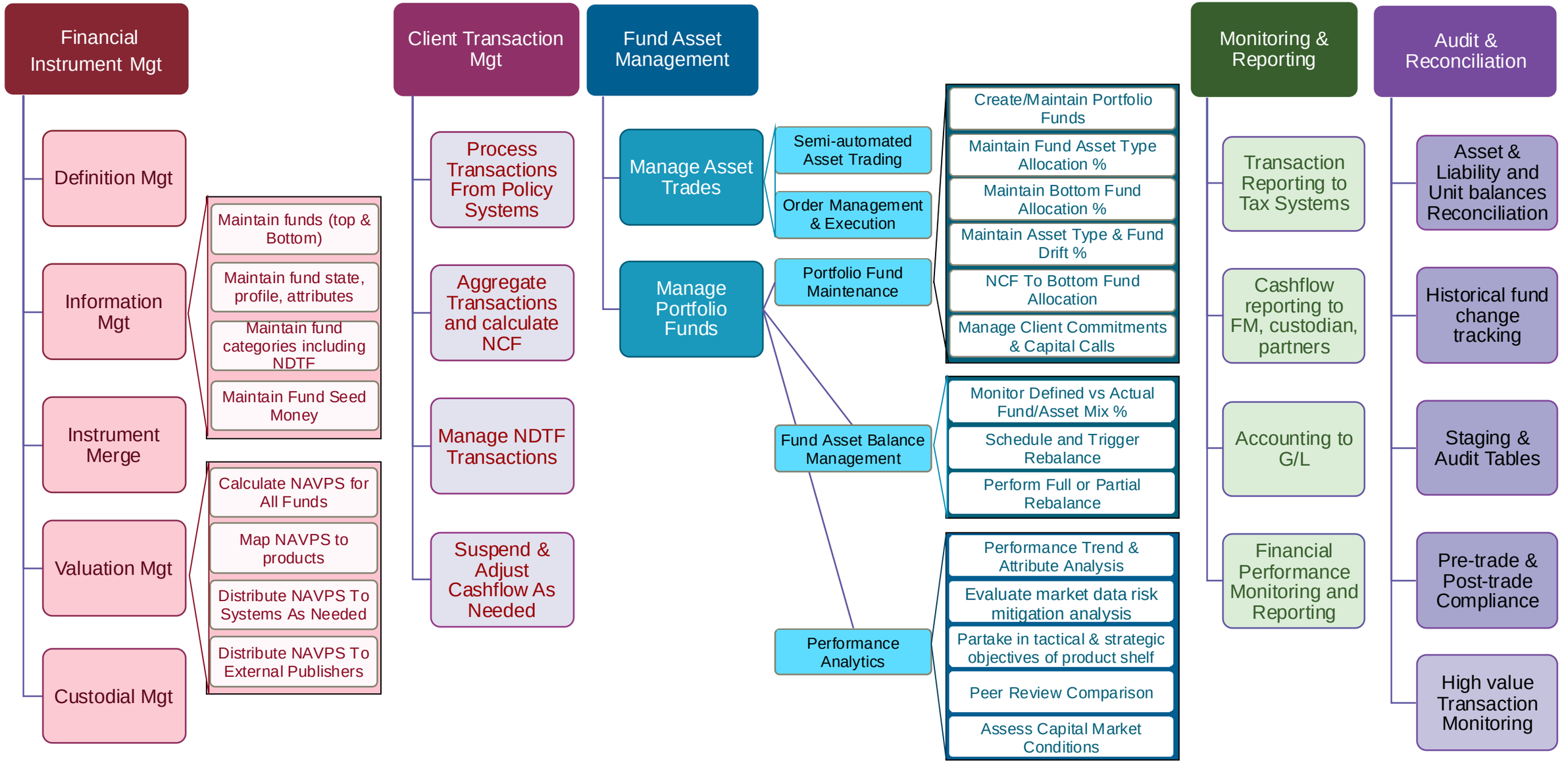
Risk Assessment – Design & Execution Phases

Risk	Reason	Impact	Impact	Mitigation
Depth of Initial scope estimate	Initial work estimate was based on the analysis of the current MF functionality and a presumed design approach. It estimated that MFGA already contained ~72% of the required functionality in whole or part. The design approach was changed by the business with an independent engagement directly to the vendor, and consequently business complexity may be different than initially estimated.	• Inaccurate initial vendor and internal delivery estimates leading to scope and timeline change	HIGH	Ideally, the project would need somebody from business with detailed knowledge of their processes and concepts to guide internal BSAs and vendor through the intricacies of the business process so that any questions that arise can be answered almost in real time.
Upgrade methodology	It takes a long time to implement a production upgrade due to comprehensive business testing for functional and infrastructure changes. The last upgrade to MFGA R22 took almost a year.	• Difficult to accurately estimate the testing cycle which would impact project schedule.	HIGH	Revisit the project plan in December 2024 to re-estimate upgrade timeline. Ensure Asset Allocation Module can be delivered with the next MFGA release (R23).
Virtual asset allocation funds	CL proprietary implementation of virtual funds is not representative of industry practice	• Vendor lacks this functionality and is unfamiliar with it.	LOW	Vendor needs early assessment of design specifics for virtual funds.
Complex and nuanced business process	The core business process as explained by the operations team is complex, nuanced and the learning curve is very steep. The assumption is that IRFI will be decommissioned as part of the project. Despite gap analysis, we don't know yet all the IRFI data dependencies that MFGA will have.	• Difficult to accurately estimate the analysis, development and testing which would impact project schedule.	HIGH	Early data dependency analysis to determine what MFGA needs. In person sessions. Proof of Concepts. Dedicated business resources.

Business Capability Model (L0) – Insurance & Wealth

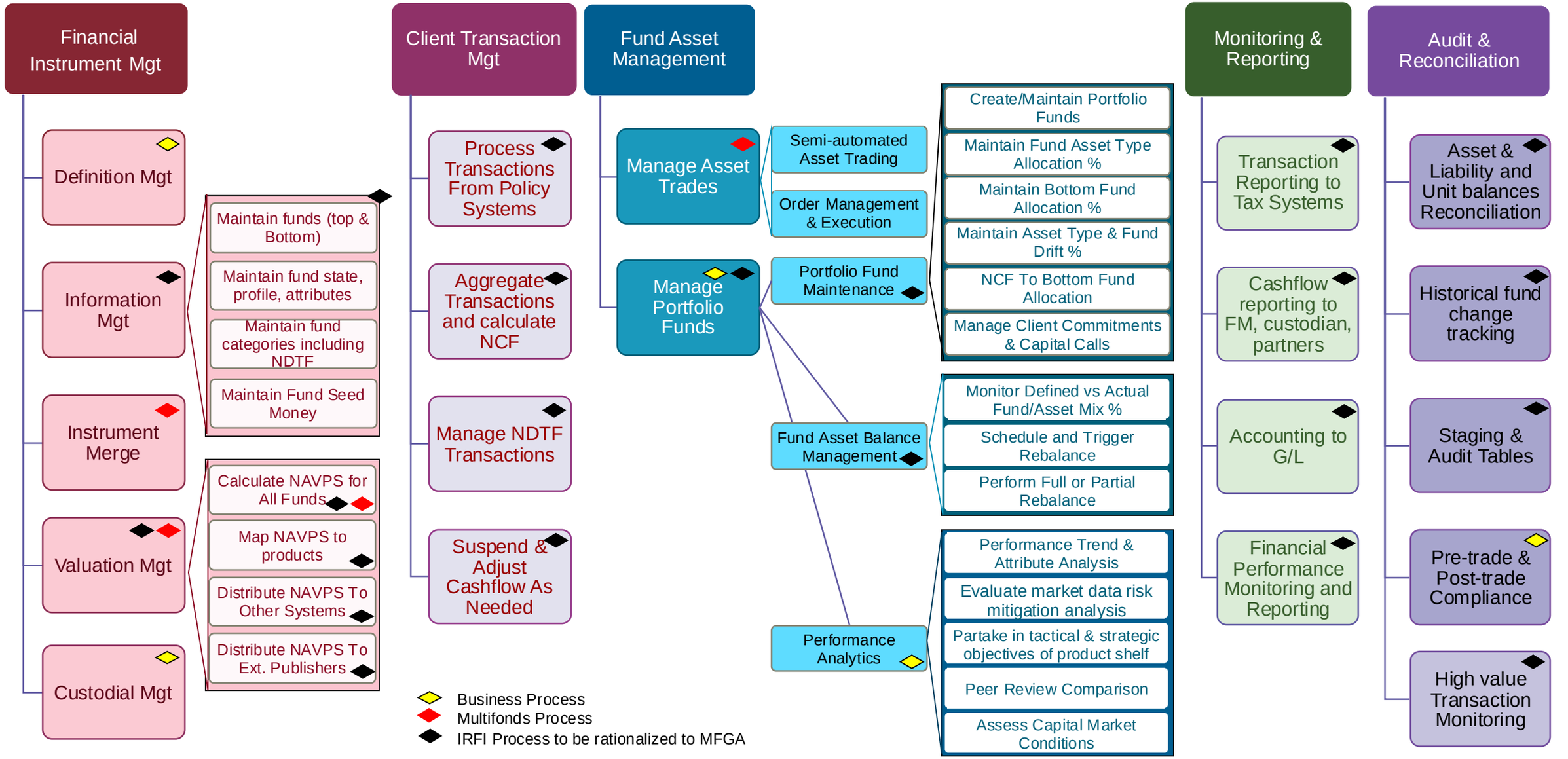


Business Capability Model – Segregated Fund Management



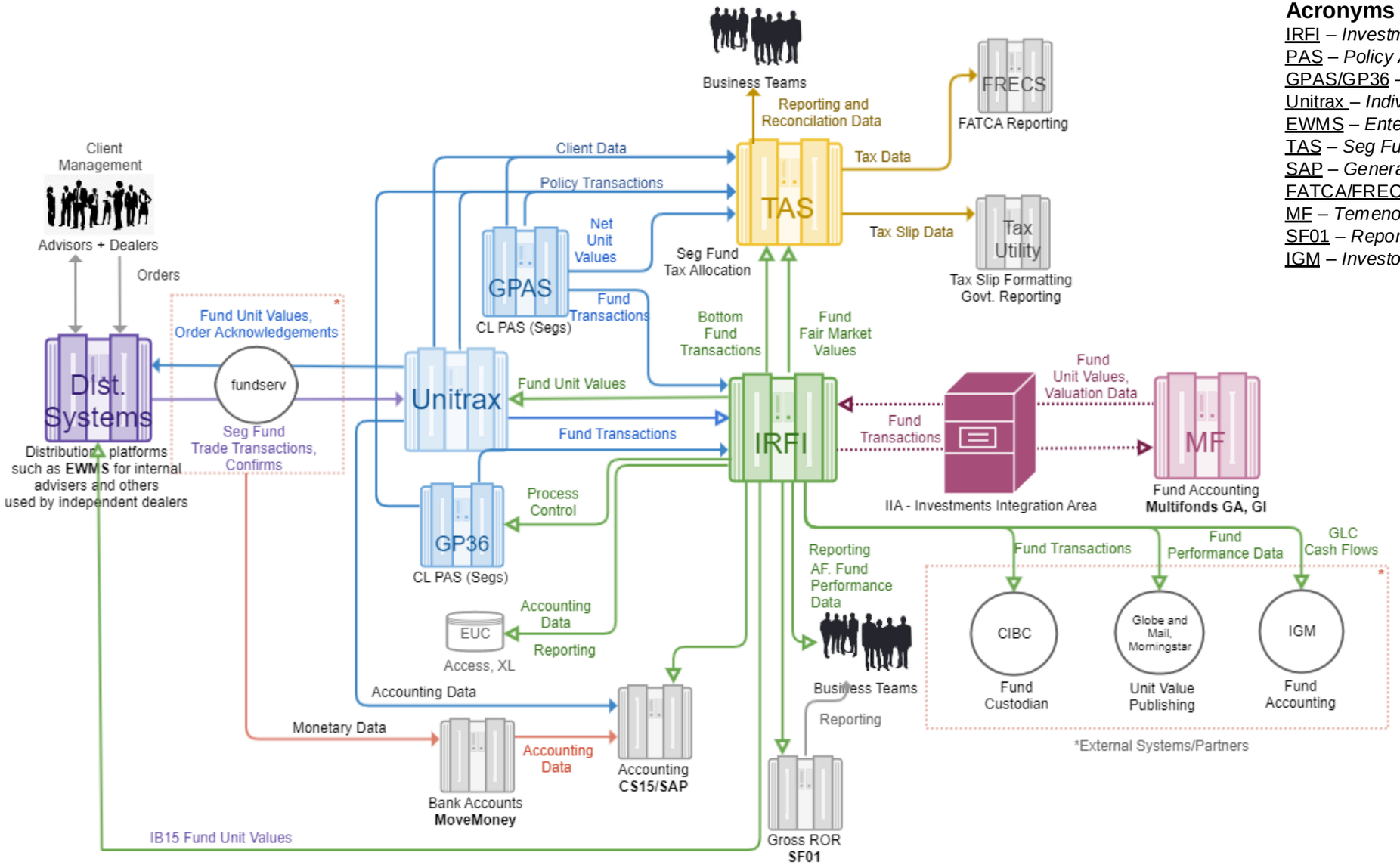
NAVPS – Net Asset Value Per Share NCF – Net Cash Flow NDTF – Non-Daily Traded Fund TAS – Tax Allocation System FM – Fund Manager Mgt - Management

Business Capability Model – Segregated Fund Management System Mapping



NAVPS – Net Asset Value Per Share NCF – Net Cash Flow NDTF – Non-Daily Traded Fund TAS – Tax Allocation System FM – Fund Manager Mgt - Management

Systems Context

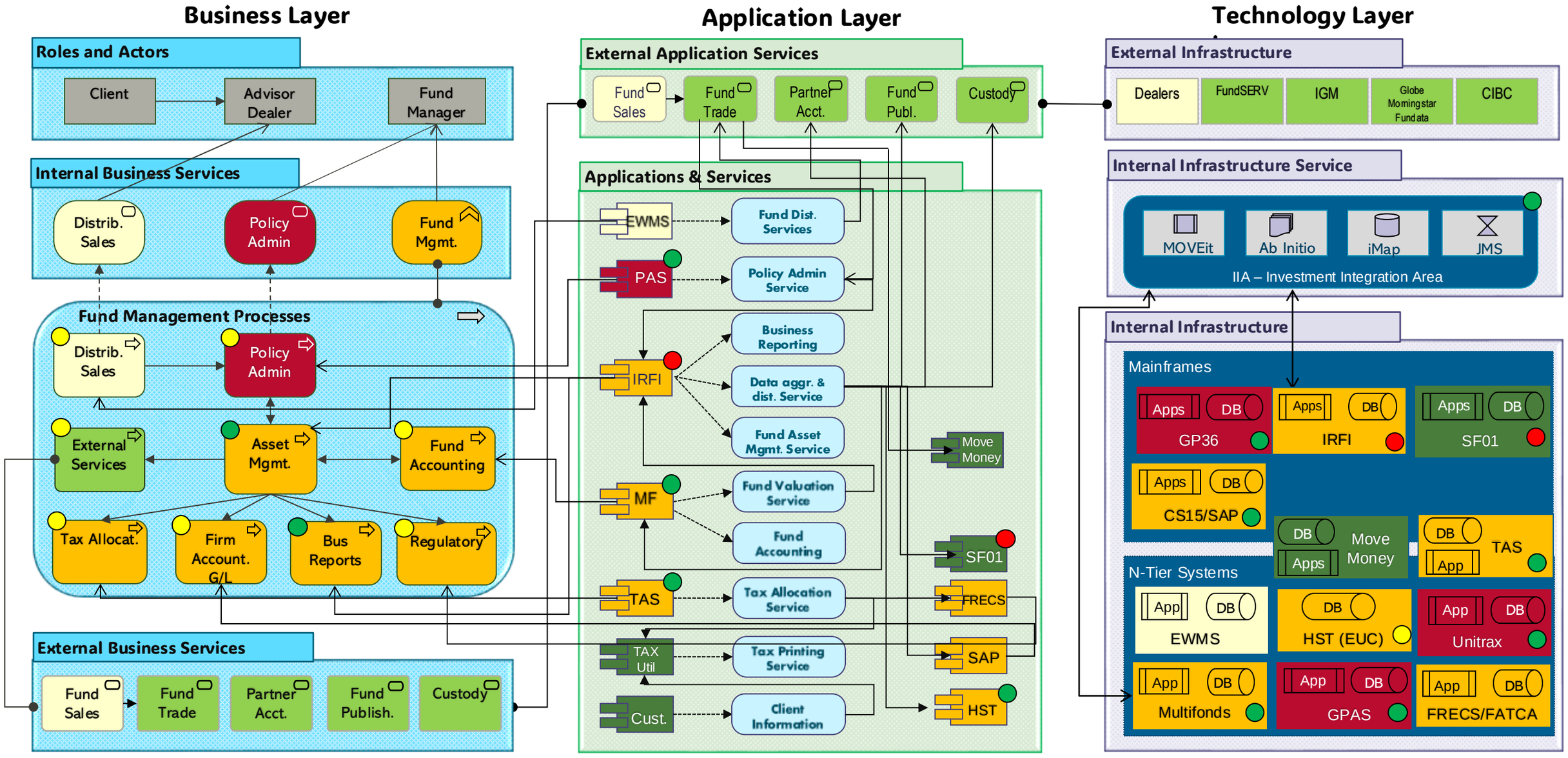


Acronyms

IRFI – *Investment Retirement Fund Interface*
PAS – *Policy Administration System (Trust Accounting)*
GPAS/GP36 – *Group PAS*
Unitrax – *Individual PAS*
EWMS – *Enterprise Wealth Management System*
TAS – *Seg Fund Tax Allocation System*
SAP – *General Ledger/accounting system*
FATCA/FRECS – *Regulatory reporting systems*
MF – *Temenos Multifonds Global Accounting – (Fund Accounting)*
SF01 – *Reporting system*
IGM – *Investors Group*

Logical Architecture

Invest | Sustain/Deprecate | Contain/Decommission



See the legend on the next slide

Logical Architecture – notes on the diagram

This type of diagram should ideally be constructed vertically from top to bottom with layers being on top of each other. However due to the landscape page format of this document the three main layers (business, application and infrastructure) have been split and are presented horizontally as swimming lanes. Therefore, the diagram needs to be read from left to right and top to bottom.

- The diagram is vertical and horizontal at the same time, it shows the decomposition of elements vertically such as 'Asset Management' into specific processes which themselves are then shown horizontally like 'Asset Management Process' in the diagram
- There are no arrow lines linking Infrastructure and Application components so that the diagram is less cluttered and easier to understand. However, the color-coding and component names make clear which element maps to which in different layers.
- Some components in the business layer are marked with a yellow circle but the corresponding application is marked green. This is to indicate that the business component is not changing but the application interface may indeed change.
- 'External Business Services' would not normally be a layer. But it is in this case since there is a number of these services involved and a few are key parts in the full business process. This layer is carried over to the application and infrastructure layers for the consistency's sake.

Legend

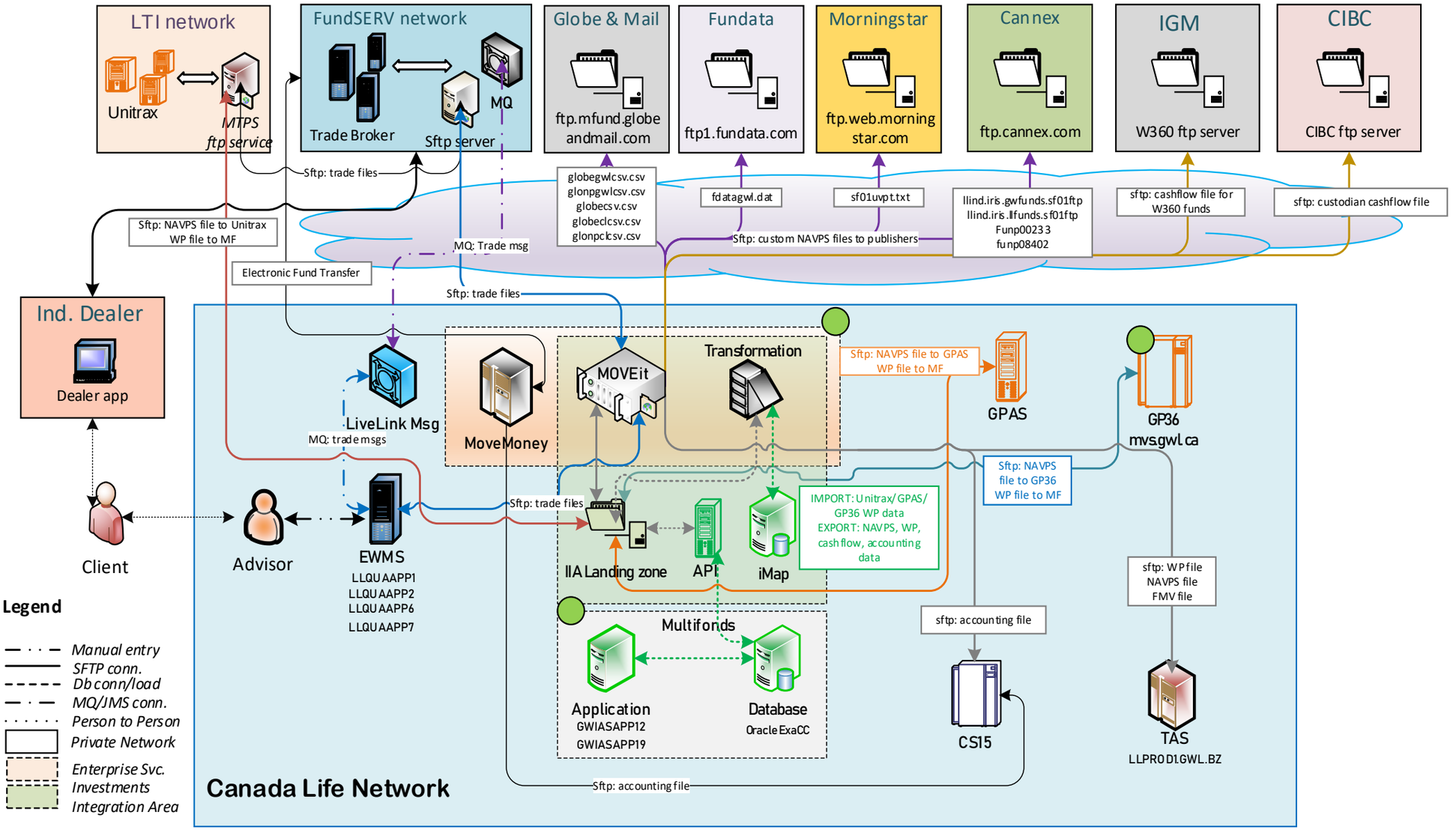
- Business layer
- Application layer
- Infrastructure layer
- Distribution supporting processes, elements, systems
- Policy administration processes, elements, systems
- Core fund management processes, elements, systems
- Supporting fund management processes, elements, systems
- The left element serves the right element
- The left element realizes the right element
- The application serves a business process
- Application service direction
- Application output going from the app on the left to the app on the right
- A decomposition of a composite or aggregate element into smaller ones
- Business service
- Business process
- Business function
- Business service

Invest Sustain/Deprecate Contain/Decommission

Acronyms

IRFI – *Investment/Retirement fund interface*
PAS – *Policy Administration Systems (generic)*
GPAS/GP36 – *Group Policy Admin System (specific)*
Unitrax – *Individual policy admin system (specific)*
EWMS – *Enterprise Wealth Management System (specific)*
TAS – *Tax Allocation System*
SAP – *General accounting system*
FATCA/FRECS – *Regulatory reporting systems*
MF – *Multifonds – fund accounting system*
HST – *Tax reporting*
Vantage – *retired PAS systems still used in some functional capacity*
SF01 – *Previous accounting system, today a reporting system*

Physical Architecture



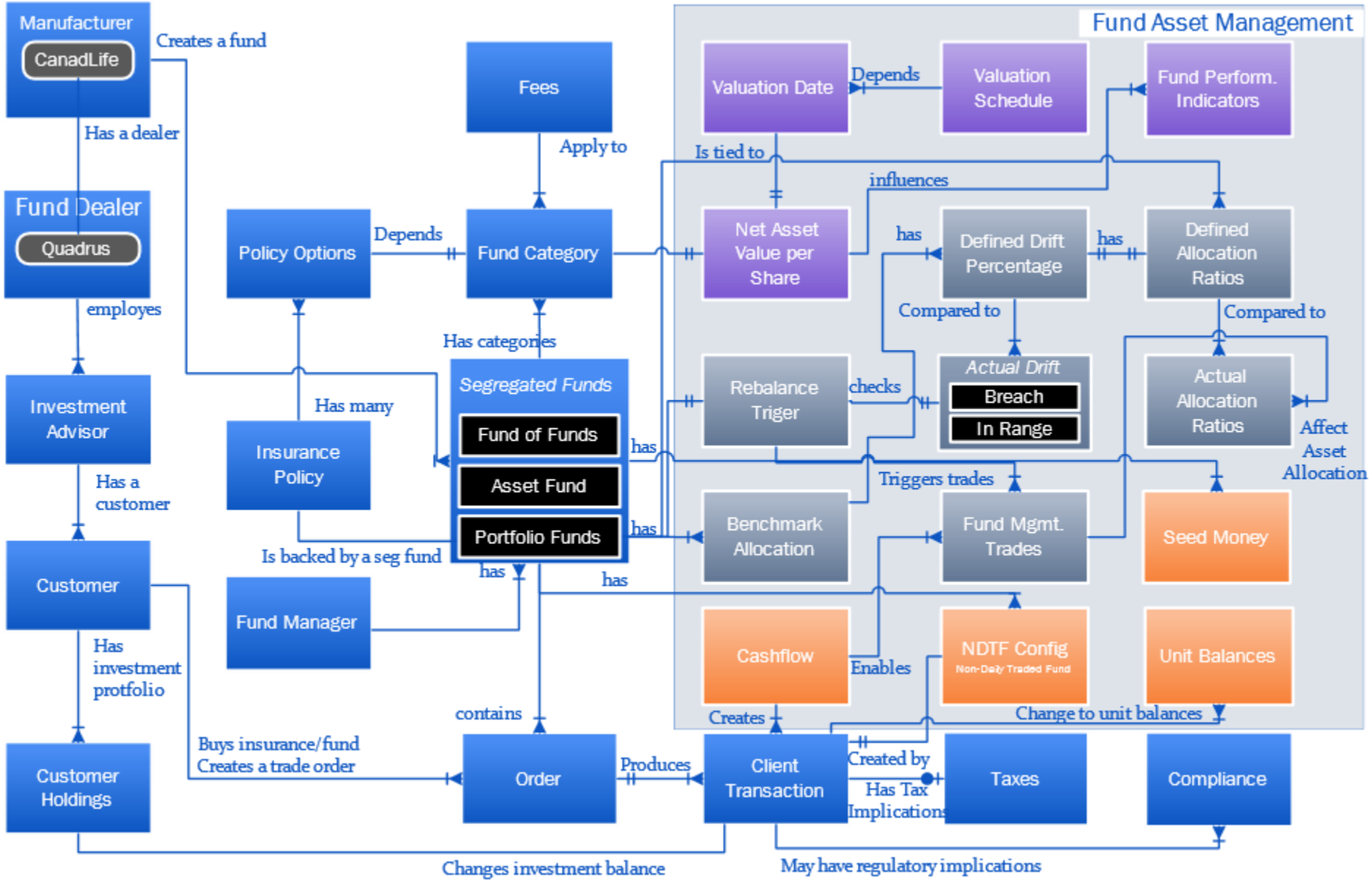
Acronyms

IREI – *Investment/Retirement fund interface*
PAS – *Policy Administration Systems (generic)*
GPAS/GP36 – *Group Policy Admin System (specific)*
Unitrax – *Individual policy admin system (specific)*
EWMS – *Enterprise Wealth Management System (specific)*
TAS – *Tax Allocation System*
SAP – *General accounting system*
MF – *Multifonds – fund accounting system*
Vantage – *retired PAS systems still used in some functional capacity*
SF01 – *reporting system*
IIA - *Investments Integration Area*
NAVPS – *Net Asset Value Per Share*
FMV – *Fair Market Value*
WP – *Withdrawal/Deposit (transaction) data*

Invest Sustain/Deprecate Contain/Decommission

Information Model

This diagram shows business entities and how they relate to each other within the business process. (This is a high-level overview and is not meant to represent specific data models or containers, see notes)



Notes

- The diagram depicts a mix of various data types. A few are proper data models such as dealer, customer, order etc. These are in the left half of the diagram starting with 'Manufacturer' in the top left corner and ending with 'Order' in the bottom right corner. They are well defined in the distribution systems as well as PAS (Policy Admin Systems), i.e. front-end investor systems.

- The right half of the diagram contains many types of data most of which are not defined as conceptual models. They all participate in the various phases of fund asset management in some significant way and that's why they are presented in the diagram.
  - Some are proper models such as 'transaction'
  - some are single attributes such as 'Net asset value per share'
  - some are calculated such as 'unit balances' and 'actual allocation ratios'
  - Some are static such as 'defined allocation ratios'
  - some are more like processes such as 'taxes' and 'compliance'
  - Some are whole data sets such as 'fund management trades', 'fund performance indicators'

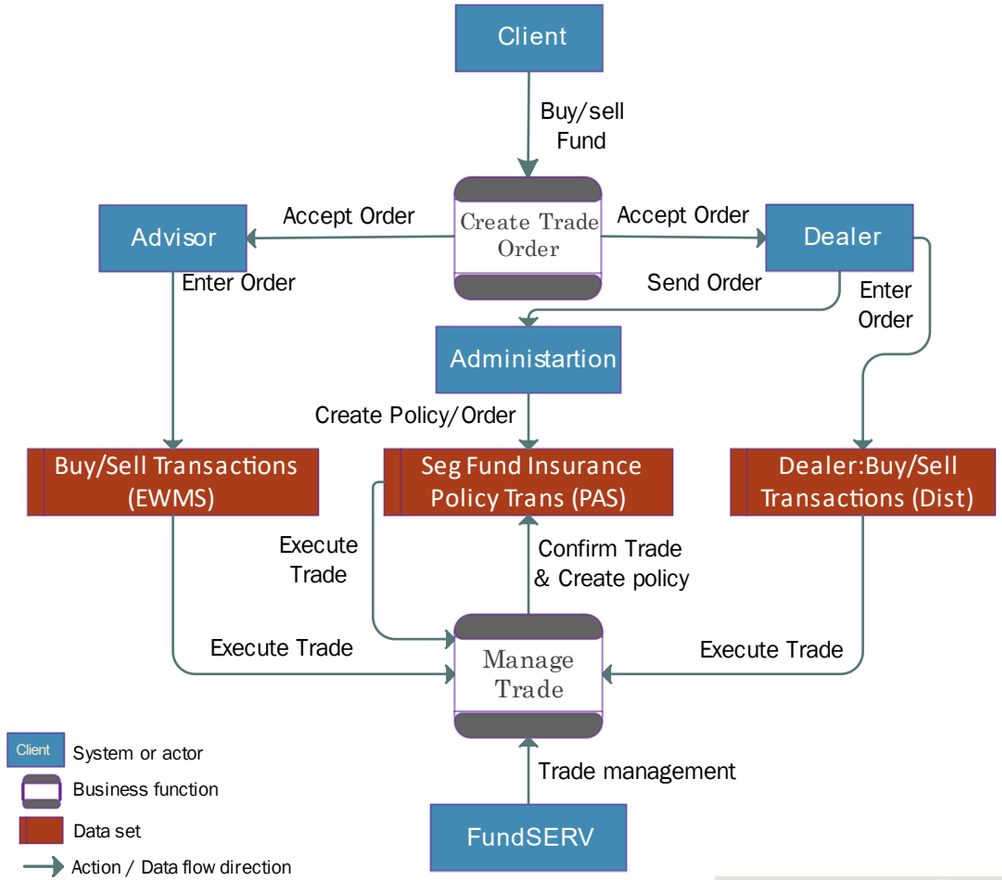
The reason for this mishmash is that

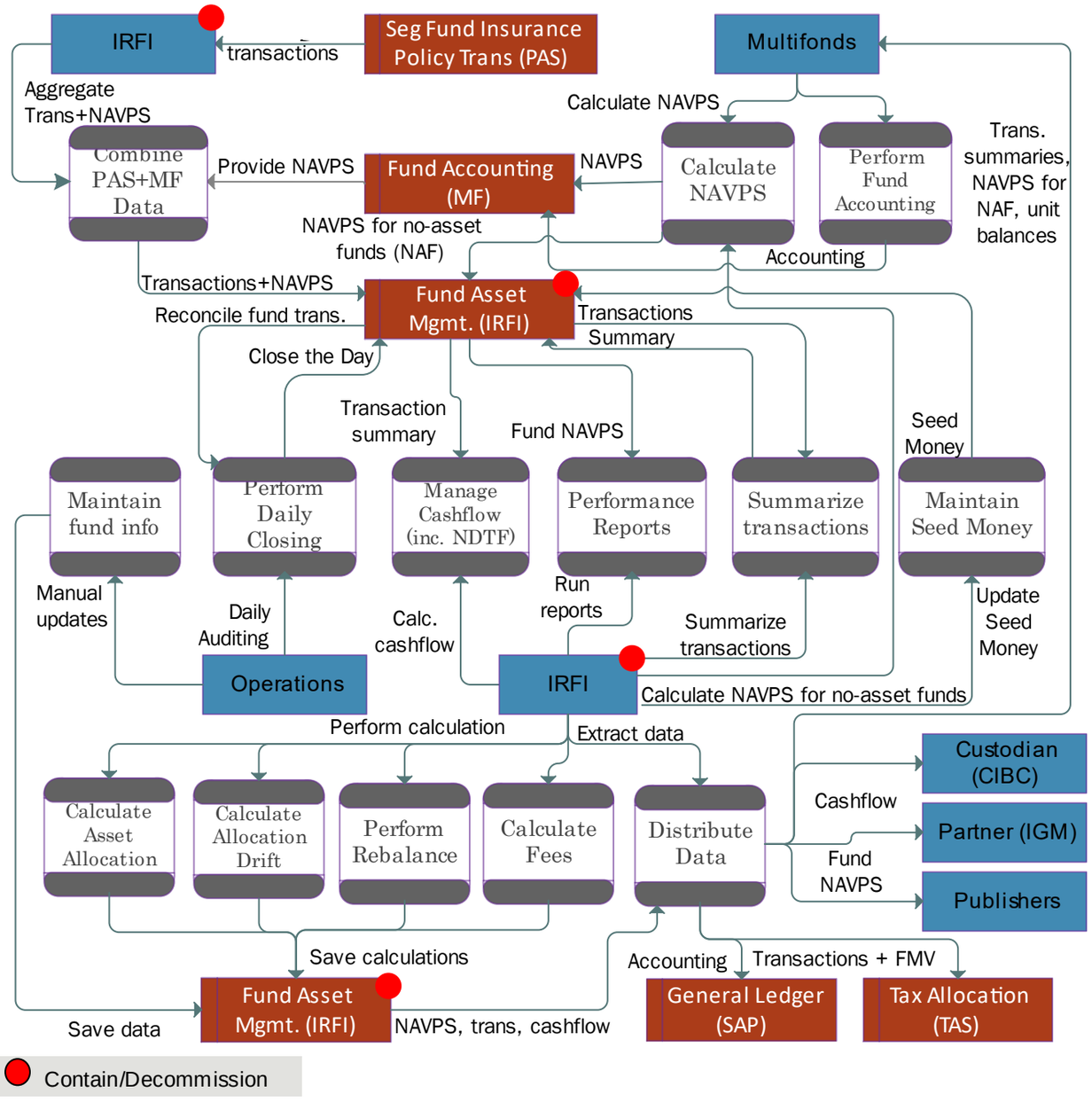
1. There is no conceptual model flowing from end-to-end. There are some conceptual models at the specific application levels such as EWMS or Unitrax, but they are not maintained across the business flow
2. The data flow across the systems within the ecosystem is ad hoc, a set of attributes thought to be useful for whichever system the data is destined for

Logical Dataflow

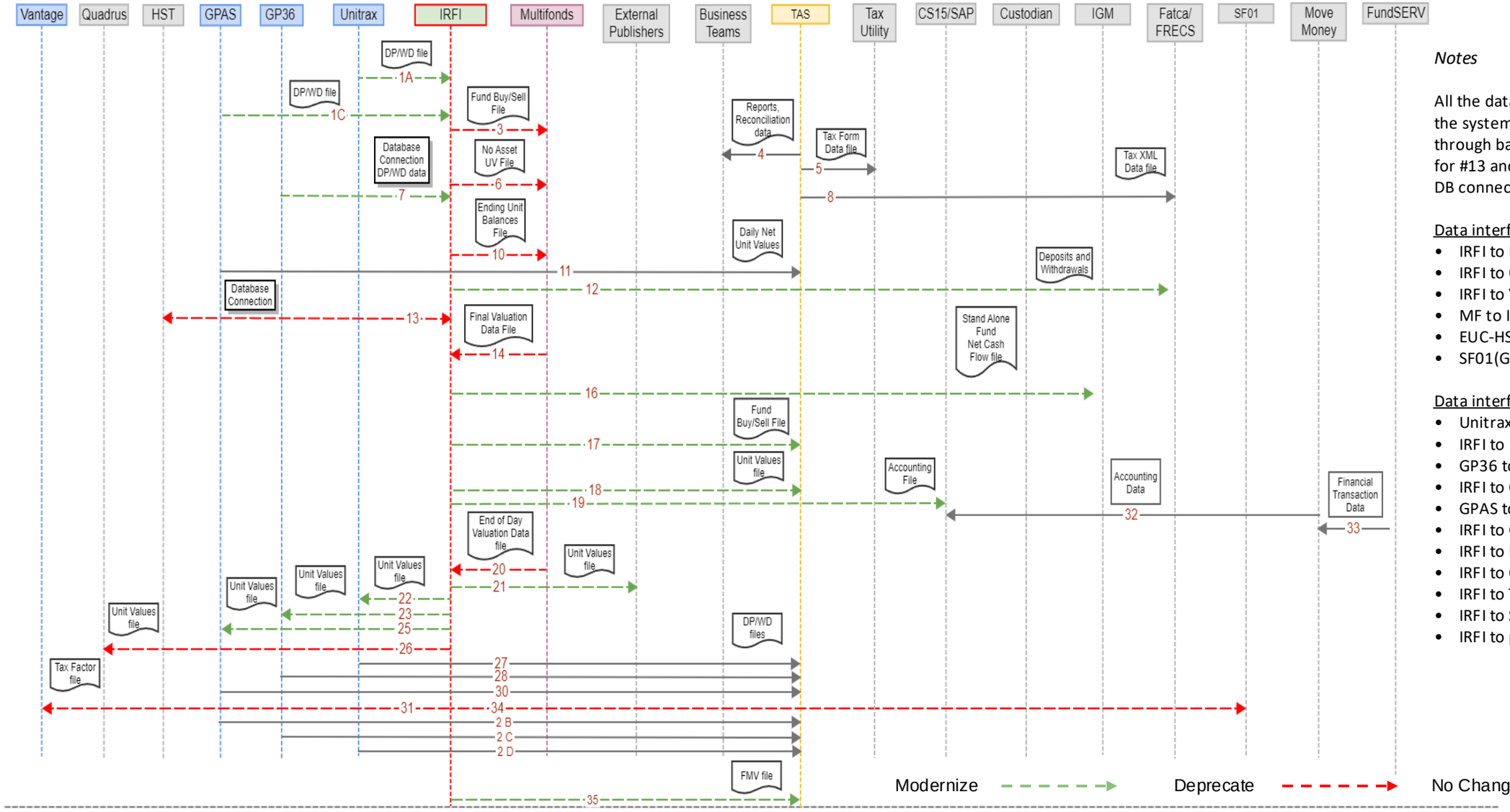
Notes

- There are essentially two related, but separate business data flows as seen in this page
- Below is shown the initial data flow, the distribution flow, that encompasses the trade life-cycle. Once the order is confirmed the second phase starts. This is shown in the second diagram. It shows the full data life-cycle of the segregated fund ecosystem post-trade.
- The “Daily Closing” function is detailed in the “Employee Journey” page





Physical Dataflow



Notes

All the data flows/interfaces among the systems in the diagram are through batch SFTP/ETL files except for #13 and #7 which are through a DB connection.

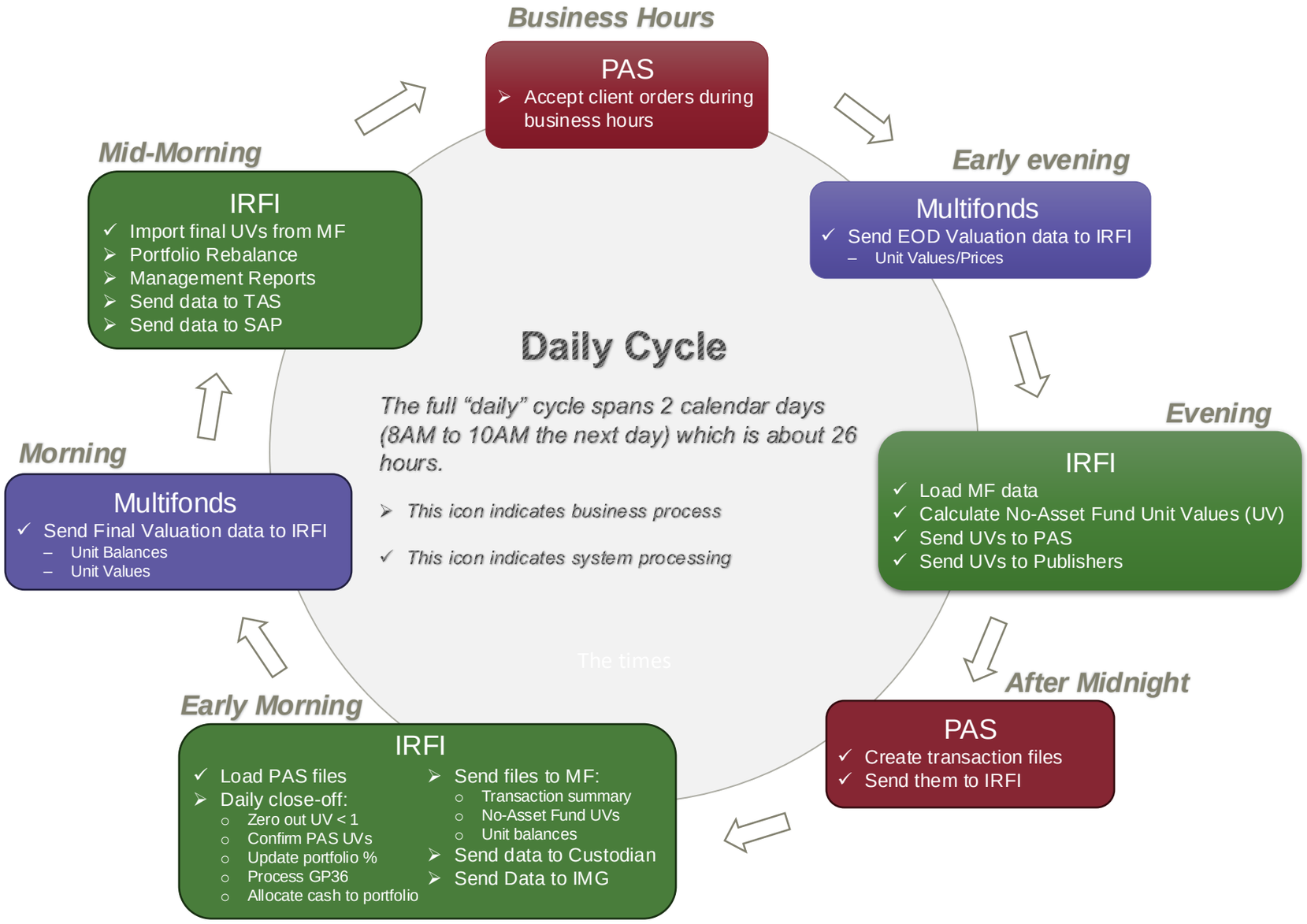
Data interfaces to decommission:

- IRFI to MF (3 files) – 3,6,10
- IRFI to Quadrus (1 file) - 26
- IRFI to Vantage (1 file) - 31
- MF to IRFI (2 files) – 14,20
- EUC-HST Rollup (Reporting) - 13
- SF01(GROR - Reporting) - 34

Data interfaces to migrate to MF:

- Unitrax to IRFI (NA) – 1A
- IRFI to Unitrax (1 file) – 22
- GP36 to IRFI (db data) - 7
- IRFI to GP36 (1 file) - 23
- GPAS to IRFI (1 file) – 1C
- IRFI to GPAS (1 file) - 25
- IRFI to IGM (1 file) - 12
- IRFI to Custodian (1 file) - 16
- IRFI to TAS (3 files) – 17,18,35
- IRFI to SAP (1 file) - 19
- IRFI to publishers - 21

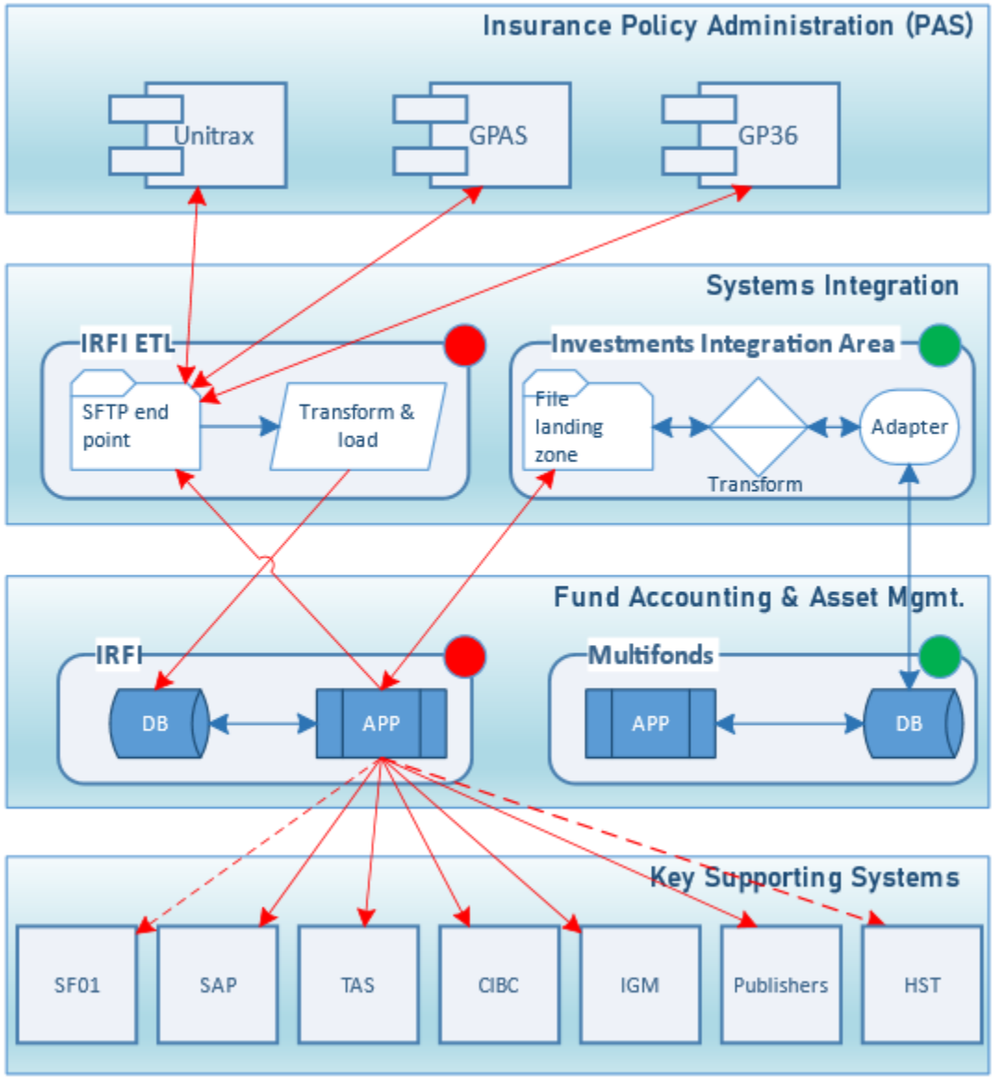
Daily Business Process and Data Cycle



This diagram demonstrates the timely, sequential and cyclical nature of business flows in the full business cycle amongst the various systems.

Note that consequently, a "daily cycle" takes more than a single calendar day. Client transactions (deposits/withdrawals) posted in PAS systems are processed the next business day. The prices for the funds are calculated at the end of the day and made available for client transaction processing the next business day.

Systems Architecture



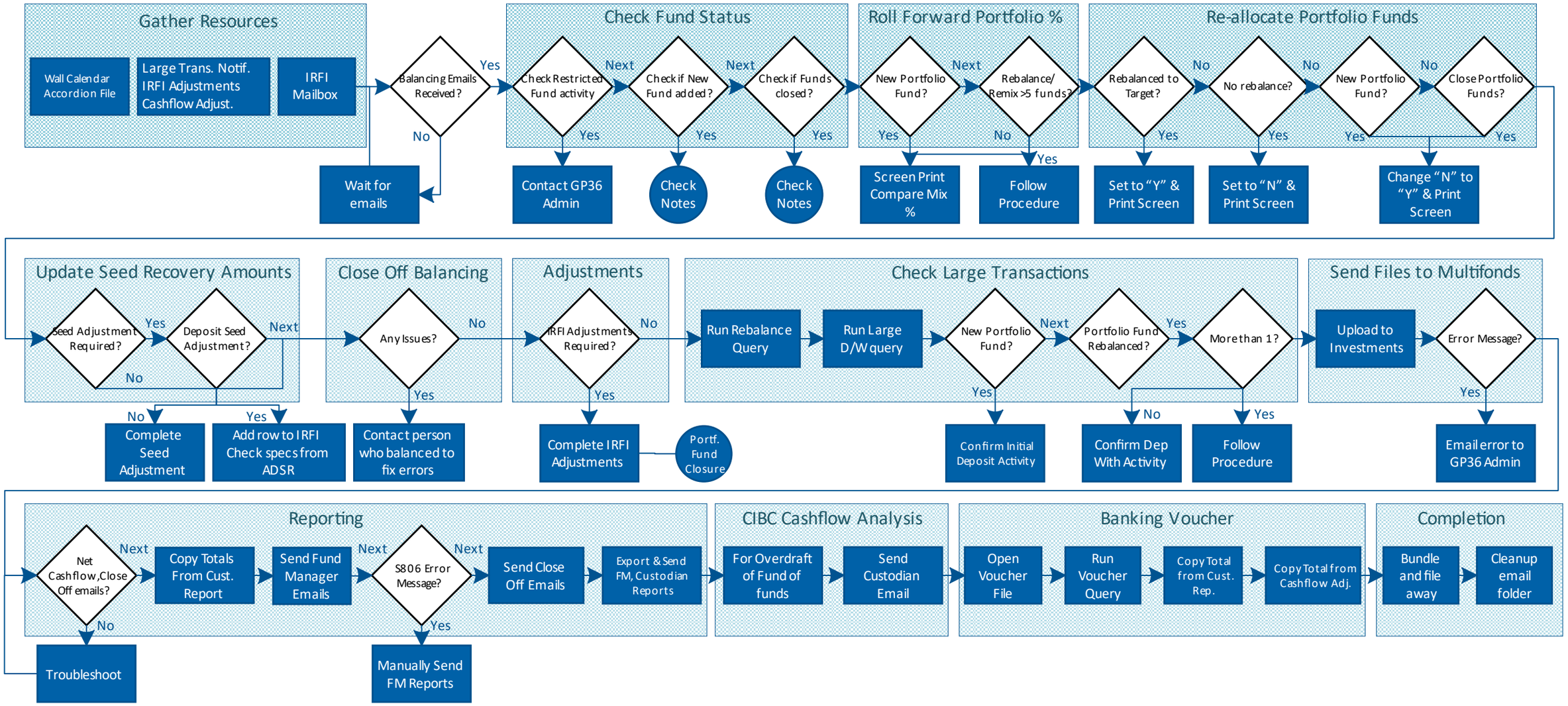
Invest Decommission Reporting One or two-way data exchange

Notes

- Since the project is not about a single application but a group of applications, this diagram is not an application diagram but a systems architecture diagram
- It contains 3 business layers (Policy Admin Systems (PAS), Fund Acct. & Mgmt., Key supporting Systems)
- And one technical layer – “systems integration”; this is the primary technical layer that is in-scope for “Interfaces” part of the project.

Employee Journey – Daily Close Off

This is the key daily manual process that prepares seg funds for the upcoming daily activity. This is done for each company GWL, LL, CL separately. The flow may slightly differ from company to company.



Employee Journey cont.

As the previous diagram indicates there is currently about 13 high level manual processes containing dozens and dozens of lower-level tasks that make up the “Daily Close Off” routine. This is an extremely high level of manual intervention that needs to be significantly reduced and eventually outright eliminated because this is not a sustainable operating model for future growth of the business.

- The “Daily Close Off” is essentially performed as a full manual oversight of the segregated fund activities on a day-to-day basis
- This may be a strategic decision by the business or simply the way the operations evolved. The intent is to avoid potential errors as much as possible
- However, in today’s world, extensive manual oversight and supervision of automated processes seems to be counterproductive and more risk-prone than letting the processes perform their tasks on their own.

The solution to manual checks and balances is to create a second level of automation that performs these checks on the first-level automation.

The below table shows a summary of tasks for all the parts of the whole process. The green color identifies current system (IRFI) tasks that need to be available in the MF to continue with the “daily close off” process as

ID	Resources	Check Fund Status	Roll Forward Portfolio PCT	Reallocate Portfolio Funds	Seed Money	Close Off	Adjustments	Large Transactions	Reporting	CIBC Cashflow Analysis	Banking Voucher
1	Balancing emails (IRFI PAS?)	Restricted fund activity	Screen print & check	Set flags for rebalance	Update seed amount	Check for balancing issues in GP36 and Portfolio funds	Perform adjustments	Confirm with PAS for new fund	Create custodian emails and reports	Check for overdraft fund of funds	Open file
2	Large transactions	New fund activity	Procedure for > 5 rebalance	Print screen			Fund closure process	Confirm with Activity if 1	Create fund manager emails and reports	Send custodian email	Run queries
3	IRFI adjustments	Funds closing						Follow procedure for more than 1	Send fund manager, custodian & close off emails & reports		Copy total from custodian rpt.
4	Cashflow adjustments								Copy totals		Copy total from adjustments

Automated task

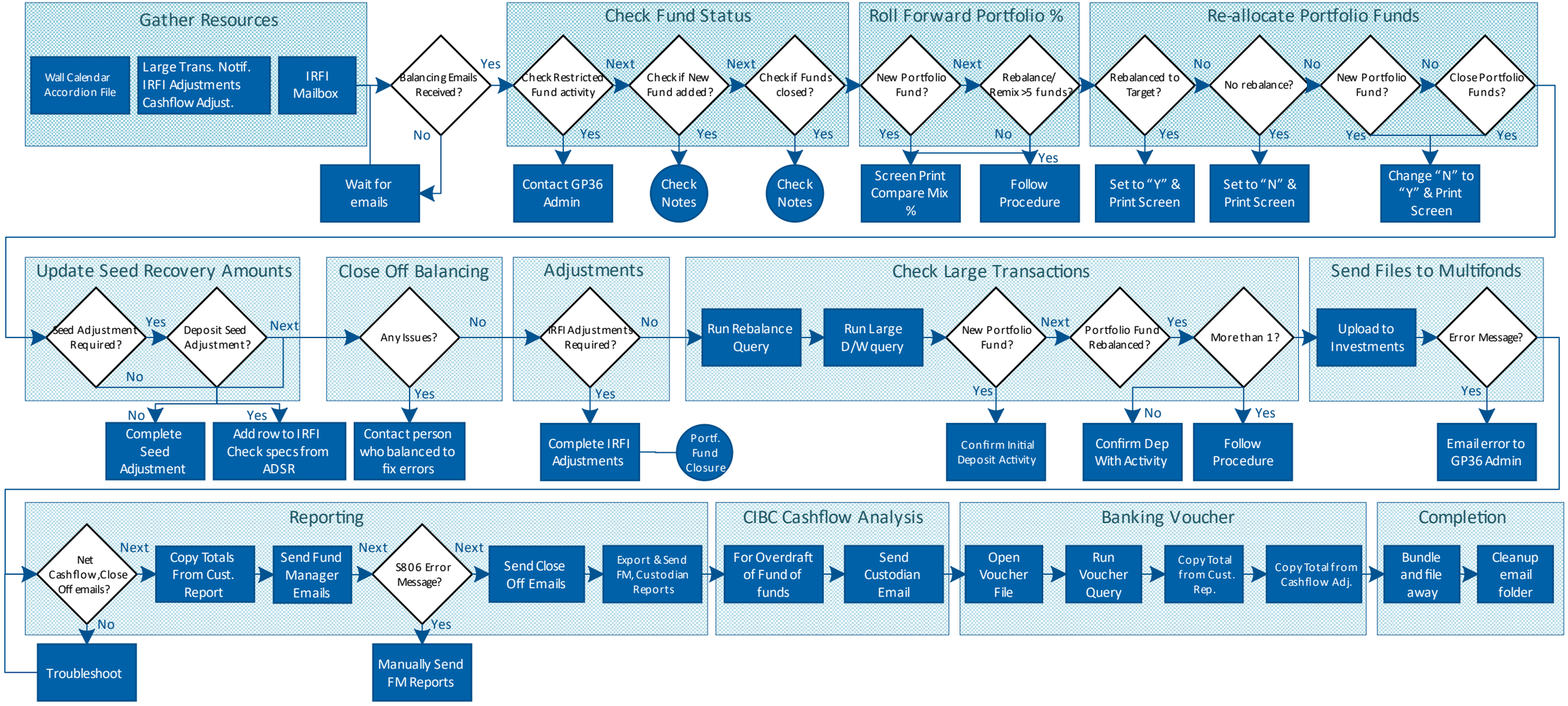
Solution Characteristics

Is this solution aligned to an approved pattern?	Yes, we will use one or more data integration patterns. IIA Reference Architecture: **IIA System Architecture.docx**
Is this solution aligned to an approved Reference Architecture?	There is no relevant reference architecture
Where will this solution be hosted?	☒ SaaS (Informatica Data Integration) ☒ Public Cloud (IaaS, PaaS) ☒ Private Cloud (IaaS, PaaS) ❑ On-Prem ❑ Combination (highlight all that apply)
Will this solution introduce a new product into the IT standards?	No
What is the scope of the solution?	❑ Single Division/Function/Business Unit ❑ Multiple Divisions/Functions/Business Units ❑ Enterprise
What are the dependencies/interfaces for this solution?	❑ No change ☒ New/changed Internal interfaces ❑ External (3rd Party) System Dependency/Interface ❑ New Enterprise Shared Service(s)

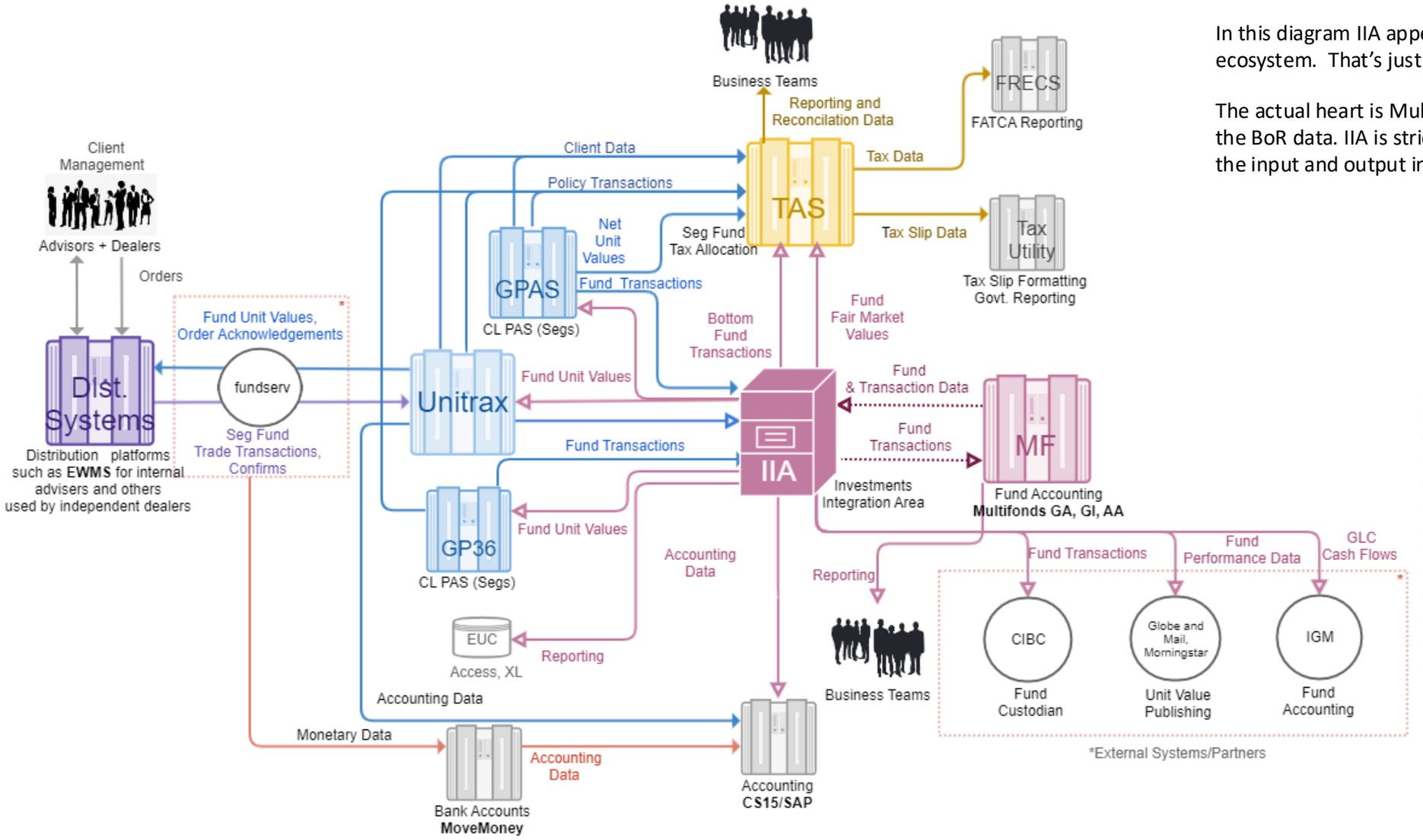
Which experiences will be impacted?	❑ Customer ❑ Advisor ❑ Sponsor ☒ Employee
Will this solution handle PII data?	The main data is financial. There is no plan to expand to include PII-type data.
Which Applications are impacted? (include APM codes)	Investments Integration Area (APM0001550) Multifonds R22 (APM0003470) Investment Retirement Funds Interface (IRFI) PG11 (APM0001947) Seg Fund Tax Allocation (TAS) (APM0001965)??? Policy Administration System (Group Customer) (APM0002228) Unitrax – WM (APM0001978) GPAS Batch (APM0002266) Accounting Control CS15 (APM0001597) Group Pension Fund Reporting (APM0002308) Personal Investment System (APM0001920) Policy Administration - II IB15 (APM0001866) Segregated Funds Monthly Net Asset Valuation (APM0001576)

Employee Journey (TBD)

In the current iteration it's not yet clear which parts of the process will be retained, re-architected or decommissioned. This diagram will be updated as the analysis and discussion with business progresses.



Systems Context



Notes

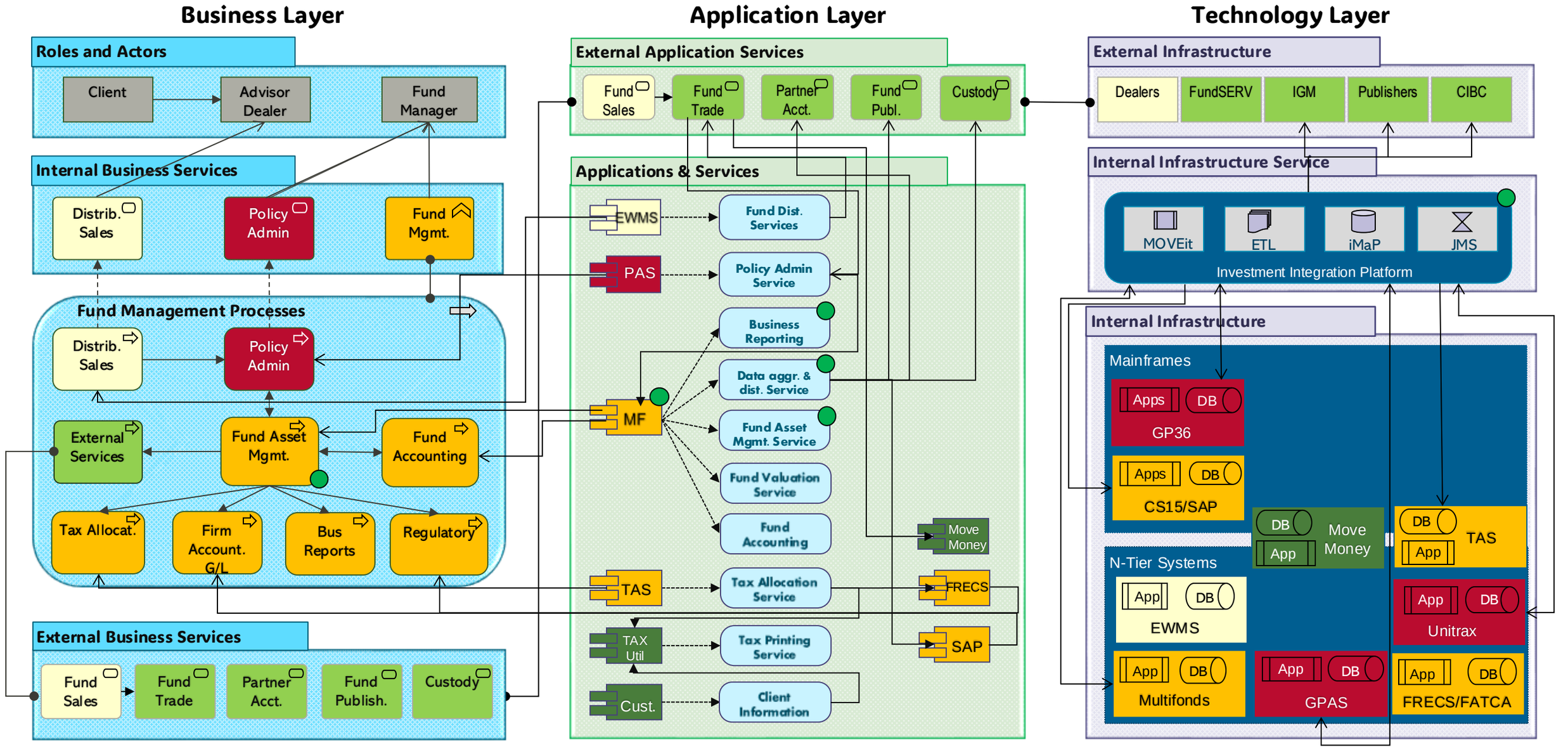
In this diagram IIA appears to become the center of the seg fund ecosystem. That's just an "optical illusion" so to speak.

The actual heart is Multifonds which contains all the functionality and the BoR data. IIA is strictly a technical integration system to control the input and output into Multifonds and other Investments systems

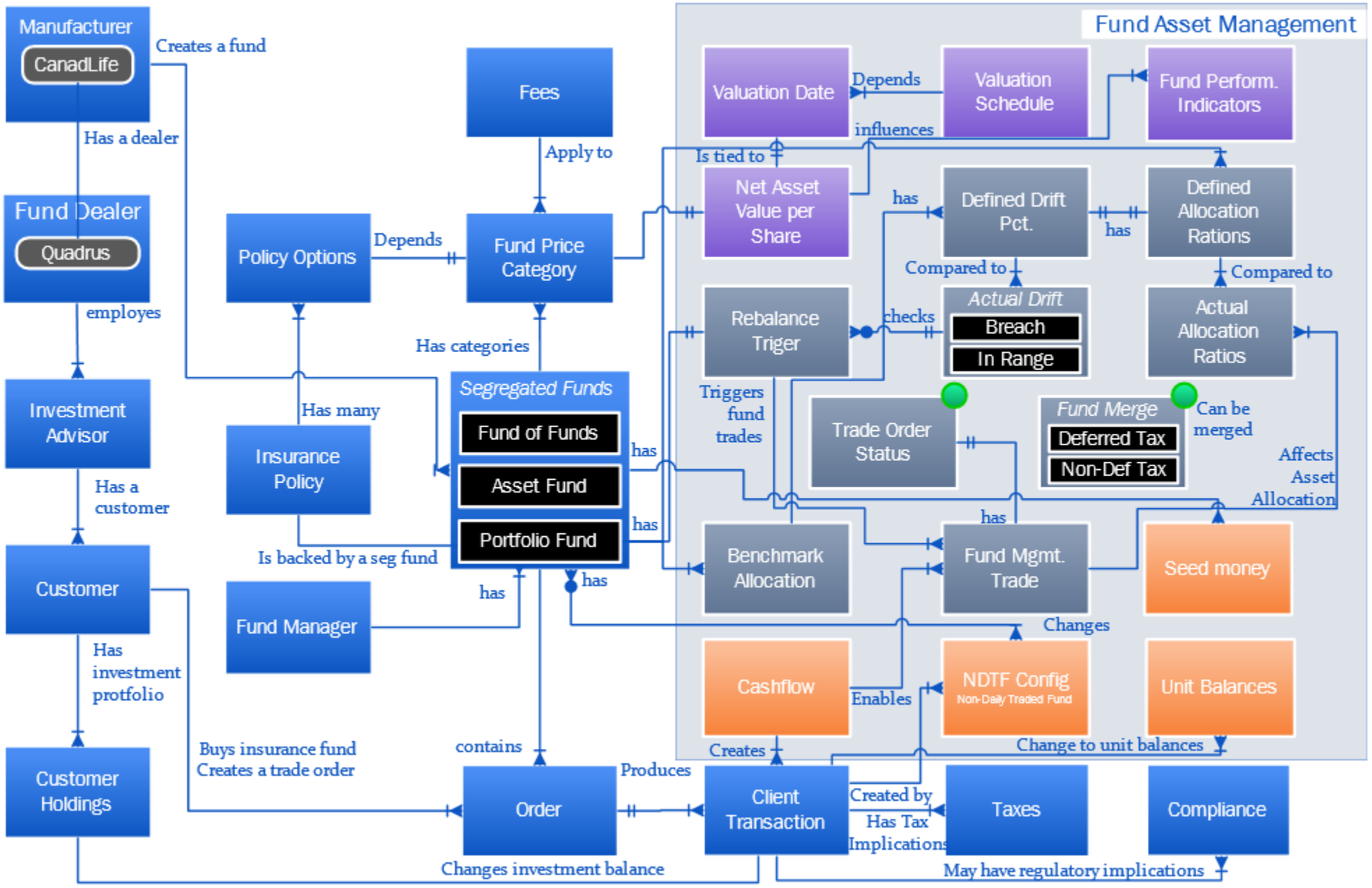
Acronyms

IRFI – *Investment/Retirement fund interface*
PAS – *Policy Administration Systems (generic)*
GPAS/GP36 – *Group Policy Admin System (specific)*
Unitrax – *Individual policy admin system (specific)*
EWMS – *Enterprise Wealth Management System (specific)*
TAS – *Tax Allocation System*
SAP – *General accounting system*
FATCA/FRECS – *Regulatory reporting systems*
ME – *Multifonds – fund accounting system*
SF01 – *reporting system*
CIBC –*fund custodian*
IGM – *Investors Group*
IIA – *Investments Integration Area*

Logical Architecture



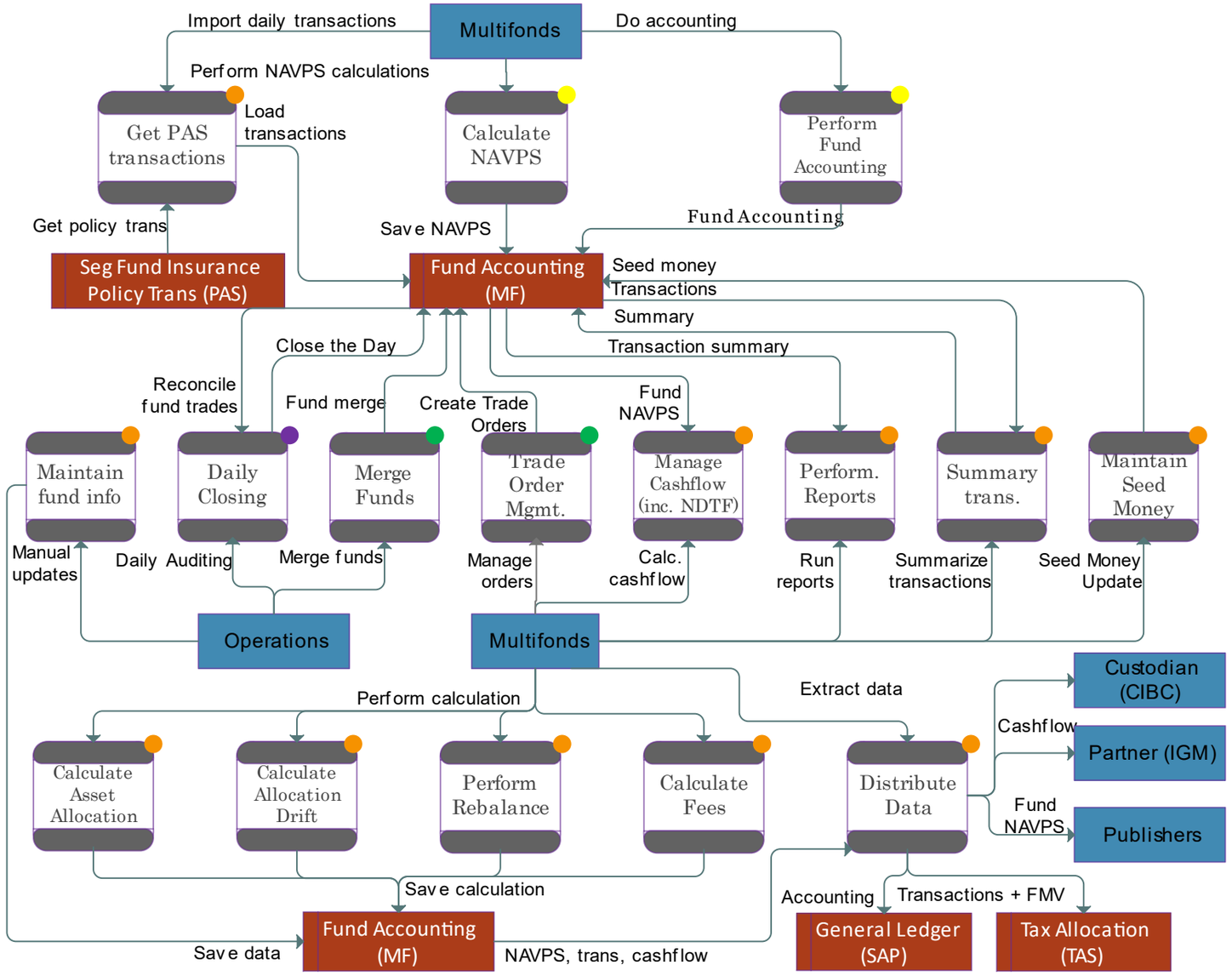
Information Model



Notes

- The Information Model is not changed much because the key business capability “Fund Asset Management” is not changing only the asset management system is changing
- There are 2 new data models or sets: one for order management and one for fund merges
- All the other data points remain but the underlying packaging/storage will change and will be designed by the vendor

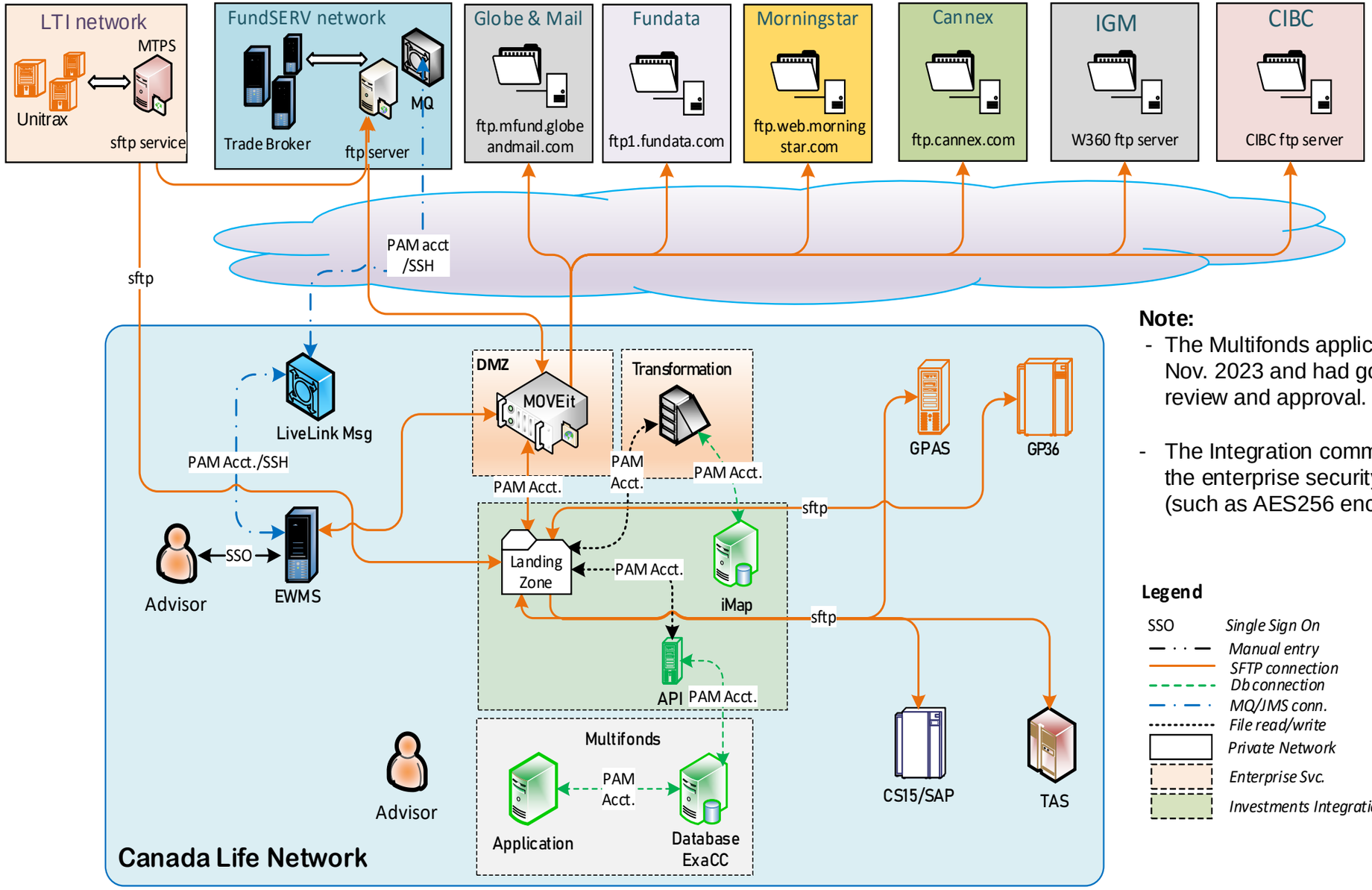
Logical Dataflow



Notes

- The diagram is best read from top to bottom
- The first diagram from the “Current Logical Dataflow” is not included because there are no changes there
- All the business functions marked with the orange dot will be added to Multifonds by the vendor based on IRFI
- There are 2 new functions being added to the business capabilities: ‘merge funds’ and ‘trade order management’

Systems Physical Security



Note:

- The Multifonds application was upgraded to version R22 in Nov. 2023 and had gone through CL Information security review and approval.

- The Integration communication and encryption will adhere to the enterprise security standards established by Canada Life (such as AES256 encryption, TLS/SSL and signed by CA).

Legend

SSO *Single Sign On*
Manual entry
SFTP connection
Db connection
MQ/JMS conn.
File read/write
Private Network
Enterprise Svc.
Investments Integration Area

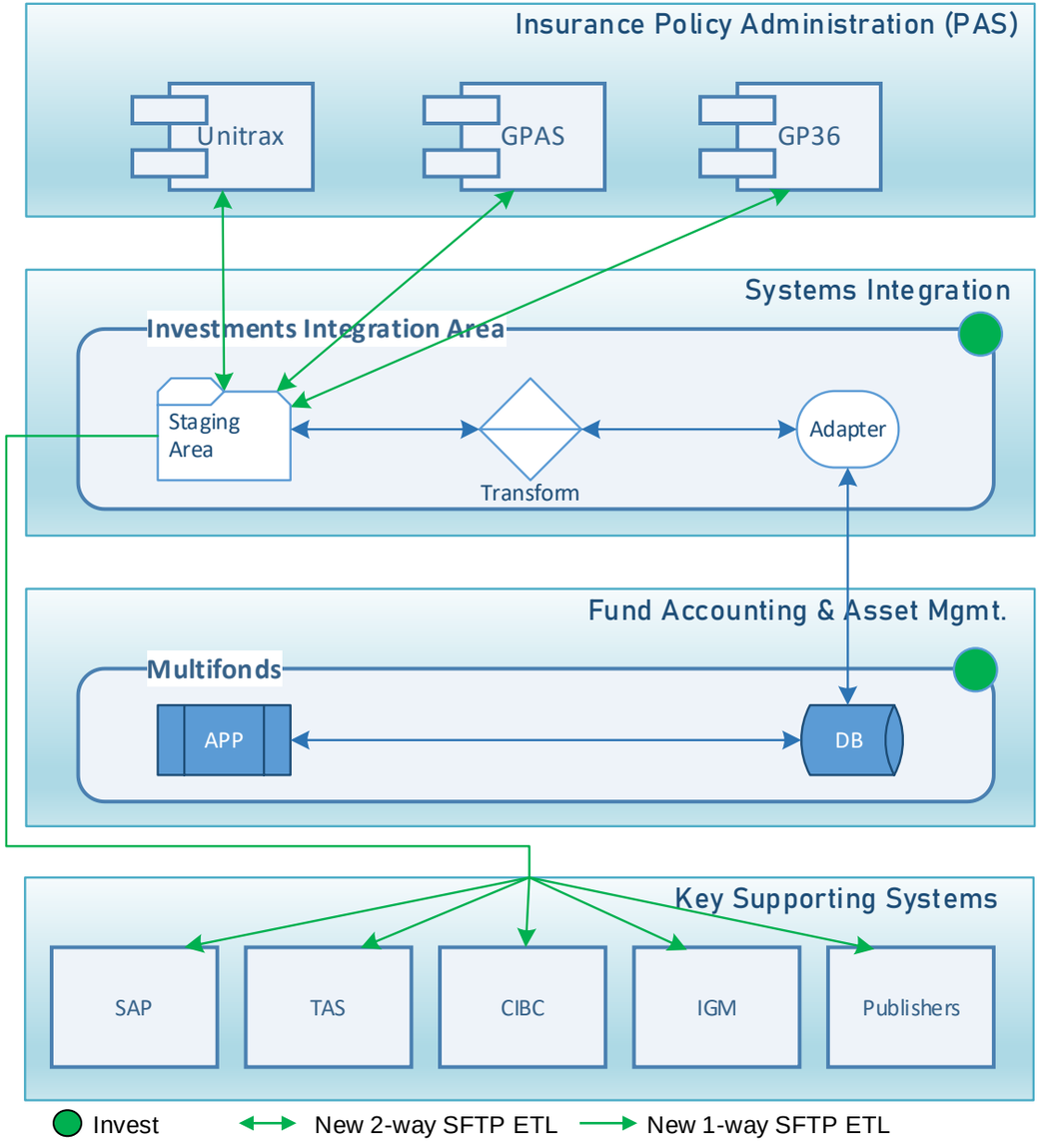
Updates

List any changes to the reviewed Candidate Architecture

Actions Items from Candidate Architecture Review

AI #	Description	Resolution	Date

Systems Architecture



Summary:

1. PAS systems (Unitrax, GPAS, GP36) will provide D/W files to Multifonds through IIA (Investments Integration Area)
2. Multifonds uses IIA as the integration mechanism for incoming and outgoing data
3. New ETL process is required within IIA for each new incoming or outgoing data file.
4. Multifonds will take over the data distribution role within the business ecosystem using IIA
5. Multifonds will send:
   - NAVPS/pricing data to all 3 PAS systems
   - NAVPS data in different formats to all the publishers
   - Accounting file to CS15/SAP
   - Cashflow file to IGM for its funds and a full file to the custodian/CIBC
   - Transaction file, NAVPS, Fair Market Value file to TAS
6. The reporting systems SF01 and EUC will be decommissioned but their current interface may be replaced with a batch file sourced from MFGA. The decision will be made in the reporting stream of the project.

Future Direction

- IIA will be gradually modernized and moved to the cloud in a separate initiative.
- Multifonds may eventually be replaced by a SaaS version

APIs / Events / Files

The below list are all batch-ETL type interfaces. It is assumed that the list is complete at this point but it's possible that additional interfaces or other details may be discovered as the project progresses.

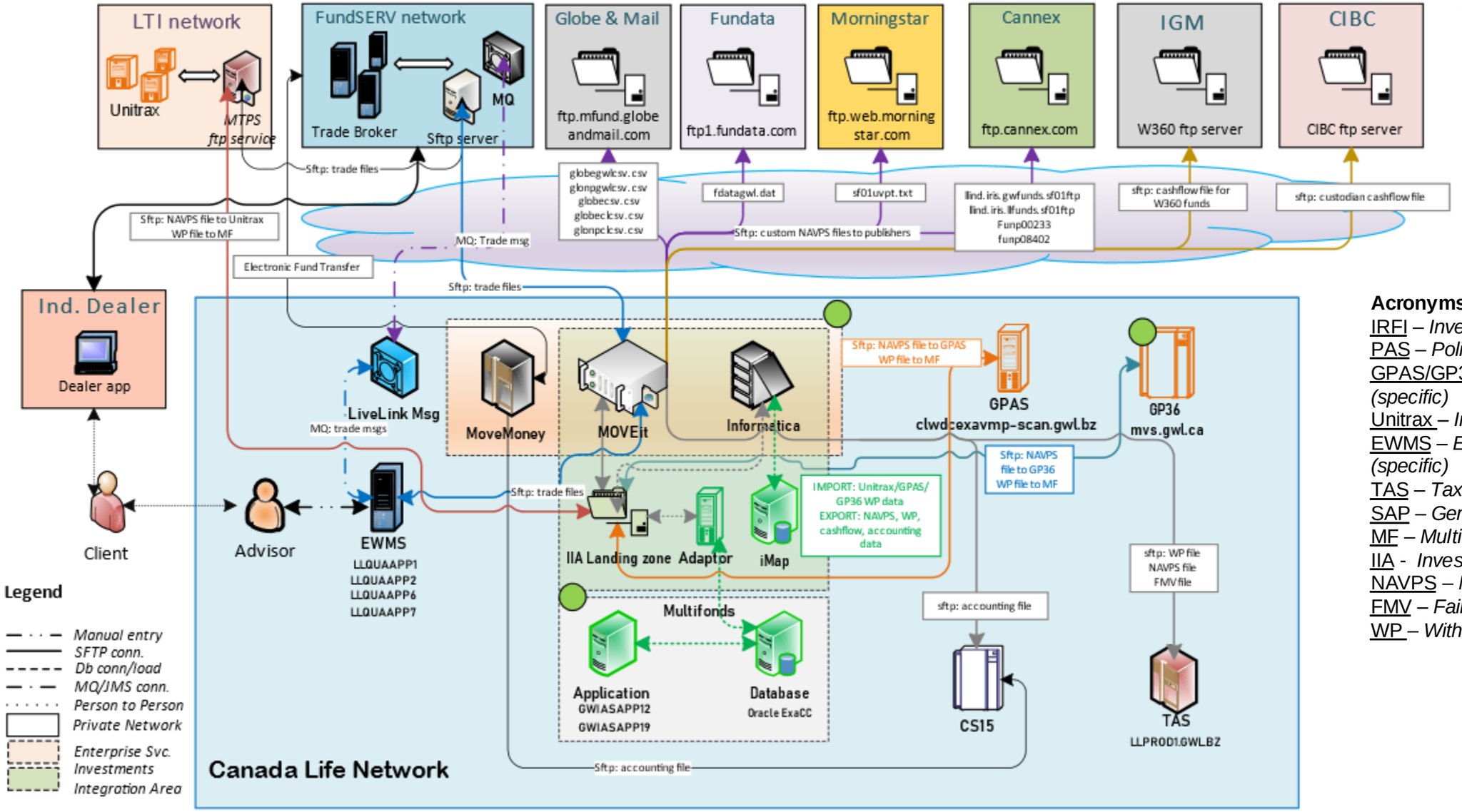
ID	Interface	Source	Target	Description/Comments
1	Unitrax to Multifonds (DW File)	Unitrax	Multifonds	Deposit(D)/Withdrawal(W)/fee file; daily batch ETL process via IIA
2	GPAS to Multifonds (DW File)	GPAS	Multifonds	D/W/fee file; daily batch ETL process via IIA
3	GP36 to Multifonds (DW File)	GP36	Multifonds	D/W/fee file; daily batch ETL process via IIA
4	Multifonds to Individual Customer Admin System (NAVPS File)	Multifonds	Unitrax	NAVPS file; daily batch ETL process via IIA
5	Multifonds to GPAS (NAVPS File)	Multifonds	GPAS	NAVPS file; daily batch ETL process via IIA
6	Multifonds to GP36 (NAVPS File)	Multifonds	GP36	NAVPS file; daily batch ETL process via IIA
7	Multifonds to IGM (Cashflow File)	Multifonds	IGM	Cashflow file; daily batch ETL process via IIA
8	Multifonds to CIBC (Accounting File)	Multifonds	CIBC	Accounting file; daily batch ETL process via IIA
9	Multifonds to TAS (DW, FMV File)	Multifonds	TAS	1) D/W/fee 2) FMV files; daily batch ETL process via IIA
10	Multifonds to SAP (Accounting File)	Multifonds	SAP	Accounting file; daily batch ETL process via IIA
11	Multifonds to publisher – Morningstar (NAVPS) Files	Multifonds	Morningstar (publisher)	NAVPS files in various formats; daily batch ETL process via IIA (1 file)
12	Multifonds to publishers – Funddata (NAVPS Files)	Multifonds	Funddata (publisher)	NAVPS files in various formats; daily batch ETL process via IIA (1 file)
13	Multifonds to publishers – Globe (NAVPS Files)	Multifonds	Globe (publisher)	NAVPS files in various formats; daily batch ETL process via IIA (5 files)
14	Multifonds to publishers – Cannex (NAVPS Files)	Multifonds	Cannex (publisher)	NAVPS files in various formats; daily batch ETL process via IIA (4 files)

APIs / Events / Files

The below list are all batch-ETL type interfaces. It is assumed that the list is complete at this point but it's possible that additional interfaces or other details may be discovered as the project progresses.

ID	Type	Domain	Version #	End Point / Topic
1	Deprecating	IRFI to Multifonds | Multifonds to IRFI	NA	1) DP/WD file 2) NAVPS for No-asset Funds 3) EOD unit balances | 2 NAVPS via IIA
2	Deprecating	IRFI to Unitrax	NA	NAVPS file; daily batch ETL process
3	Deprecating	IRFI to GPAS	NA	NAVPS file; daily batch ETL process
4	Deprecating	IRFI to GP36	NA	NAVPS file; daily batch ETL process
5	Deprecating	IRFI to TAS	NA	1) D/W/fee 2) NAVPS 3) FMV files; daily batch ETL process
6	Deprecating	IRFI to SAP	NA	Accounting file; daily batch ETL process
7	Deprecating	IRFI to CIBC	NA	Accounting file; daily batch ETL process
8	Deprecating	IRFI to IGM	NA	Cashflow file; daily batch ETL process
9	Deprecating	IRFI to Publishers	NA	NAVPS file; daily batch ETL process
10	Deprecating	IRFI to EWMS	NA	NAVPS file; daily batch ETL process
11	Deprecating	IRFI to Vantage	NA	Tax factor file daily batch ETL process

Proposed Physical Architecture



Summary:

1. Decommission IRFI
2. Decommission all IRFI interfaces to other systems
3. Recreate all relevant interfaces in IIA as the integration proxy for Multifonds
4. Make Multifonds the source of all outgoing data to downstream systems

Acronyms

IRFI – *Investment/Retirement Fund Interface*
PAS – *Policy Administration Systems (generic)*
GPAS/GP36 – *Group Policy Admin System (specific)*
Unitrax – *Individual policy admin system (specific)*
EWMS – *Enterprise Wealth Management System (specific)*
TAS – *Tax Allocation System*
SAP – *General accounting system*
MF – *Multifonds – fund accounting system*
IIA - *Investments Integration Area*
NAVPS – *Net Asset Value Per Share*
FMV – *Fair Market Value*
WP – *Withdrawal/Deposit(transaction) data*

Invest Sustain/Deprecate Contain/Decommission

Reporting (TBD)

Some change is expected as we continue to define Scope

Report ID	Type	Domain	Version #	Details
1	Modifying	Cashflow reports & emails for fund managers	NA	Multifonds must be able to handle these reports
2	Modifying	Custodian report & emails	NA	Multifonds must be able to handle these reports
3	TBD	Tax reporting, this is a report on HST for some funds	NA	This will be decommissioned in IRFI but may be recreated in Multifonds based on the business reporting requirements
4	TBD	SF01 – monthly gross rate of return	NA	This will be decommissioned in IRFI but may be recreated in Multifonds based on the reporting business requirements

Architectural Decisions

AD #	Name	Description	Impacts
1	IFS Interface Development Approach	Select the best option for building the IRFI replacement interfaces into Multifonds. The aim of this initiative is to enhance the efficiency, reliability, resiliency, scalability, and DR capabilities of integration processes. **Options** 1) Hybrid Cloud 2) Full Cloud 3) On Premise (WDC/SDC)	Schedule Resources
2	Use Ab Initio or Informatica for ETL development	**Ab Initio** – Ab Initio will be retired once all the current jobs are migrated to Informatica. **Informatica** – The introduction of Informatica to CL environment aligns closely with this project's interfaces development schedule.	• Alignment with the enterprise strategic direction by being an early adopter of the new enterprise technology • Avoid the future migration cost of moving the ETL processes from Ab Initio to Informatica
3	Seg Fund Product Catalog	This may be a project scope decision first (rather than an Architecture Decision) since the Seg Fund Product Catalog impacts more than just the IFS project. Donna maintains a Seg Fund Product catalog in an Excel spreadsheet. It contains Seg Fund attributes along with keys used for mapping funds between several systems. The spreadsheet is a key input to ETL interface jobs between multiple systems, not just IRFI. This Seg Fund Data is key business data and should be managed in an enterprise grade database with appropriate data management processes surrounding it.	Scope Schedule

Architectural Decisions (cont'd)

AD #	Name	Description	Impacts
4	Unitrax to Multifonds Interface	Decide if the project uses the current output from the "Unitrax to IRFI" ETL job or build new interface for Unitrax to Multifonds. There is an ETL job that takes 3 files from Unitrax and manipulates the data to produce 7 files for IRFI. Should the Unitrax to IRFI code be removed from the ETL and modernized in a different process/code module for the feed from Unitrax to MFGA? Also, should the feed refactor the 3-company legacy data feeds to one unified Canada Life company feed?	Schedule Scope Resources

Technical Debt

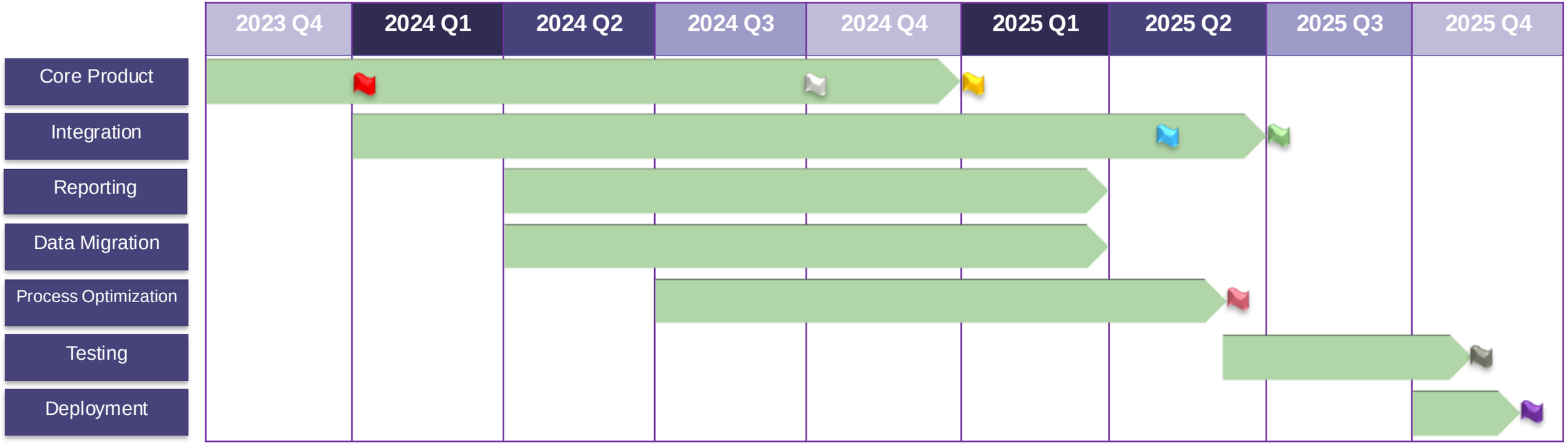
TD #	Type	Description	Target to Address	Confirmed Funding?	Associated AD
1	❑ Introducing ❑ Continuing ☒ Retiring	Mainframe system IRFI is being retired and replaced by an existing vendor system Multifonds (MF) with all business functionality being migrated from IRFI to MF.	Critical business dependency on mainframe legacy systems	Yes	NA

Non-Functional Requirements (Multifonds)

Overall Requirement	Current State	Target State
High Availability	No **(**There is a requirement for a 1-hour Service Restoration Time (SRT) for the Multifonds solution per server component)	Same as current state.
Critical Operating Hours	In North America: - The Critical business processing hours are 1:00 PM through 7:00 PM CST on weekdays. In Europe: - The Critical business processing hours are 8:00 AM – 10:00 AM and 2:00 PM – 4:00 PM GMT	Same as current state.
Maintenance Windows	Planned maintenance on weekends	Same as current state.
RTO	<= 24 hours	Same as current state.
RPO	<= 24 hours	Same as current state.
What monitoring tools are leveraged?	No extra monitoring tools other than what is part of the system's logging and error handling. Splunk was tried in an earlier version (v5.3) but had high performance impact and so was not implemented. (**Note**: - Work is currently in progress to bring in Splunk and AppDynamics monitoring on the latest Multifonds R22 version)	Same as current state.
Does the NFT environment reflect production?	Yes - for software version and data (production data), No – for hardware, NFT is less powerful	Same as current state.

Service Level Agreements	Green	Yellow	Red
% of transactions that are processed successfully No SLA for transactions	≥ 98%	< 98% ≥ 90%	< 90%
% of transactions over 3 secs processing time	≥ 93%	< 93% ≥ 85%	< 85%

Conceptual Roadmap



Milestone	Date
BRD & FSD approvals complete	Dec 29, 2023
Asset allocation module build complete	Sep 30, 2024
Asset allocation module test complete	Dec 31,2024
Integration build complete	Apr 30, 2025
Business process optimization complete	May 31, 2025
Integration test complete	Jun 30, 2025
Cycle test complete	Oct 31, 2025
Go live complete	Nov 30, 2025

Strategic Approach to Interface "Migration"

Rationale - For a major and lengthy project such as this one it's very useful to set out some basic strategic parameters to the project. This page looks at possible approaches from 3 different angles. This is only applicable to the interfaces workstream not the whole project as such.

- The interfaces already exist and so they are logically simply being migrated.
- IRFI data integrations are mostly designed and built using point-to-point pattern, but this does not align with the Investments approach of decoupling system integrations.

1. Project Strategy - Time and Effort

- Retain – A "migration" typically involves doing only the necessary changes and leaving everything else as is. This approaches is usually enforced by limited funding and tight deadlines. This is not the case here where both funds and timelines are sufficient for more than minimal effort.
- Modernize – Additionally, the project mandate is to "modernize" and "improve" which would suggest redesign and "re-architecting".

2. Architecture Breadth – Point-to-Point or Decoupling Approach

- Point-to-Point approach - Each integration is a single point-to-point interface. All integrations are built into a single ETL job. This is the existing pattern used for IRFI.
- Investment Approach – Since we are re-creating these interfaces in bulk (15 or so) in this project, it's useful to look at them in broader terms and look for common approaches. Investments already has an integration platform called IIA (Investment Integration Area) that uses a common pattern to decouple system interfaces. This platform will be used for all integrations.

  Additionally, some of the Seg Fund data may benefit from a broader scope than just a system-to-system connectivity. For example, fund pricing could be offered to interested internal clients. Rather than distributing the data as batch files, an Enterprise solution such as the Connected Data Platform should be considered.

3. Architecture Patterns & Technology

- Patterns – The current integration pattern in the Seg Fund ecosystem is exclusively "batch ETL" running sequentially. This is still the best pattern because the data availability is always end-of-day due to the fund pricing model which is and will stay EOD for a foreseeable future. Hence there is no need for real or near real time data communication. Sequential mode is also sufficient because of the low volumes of data. However, the situation changes if our view changes to an enterprise view as suggested above. In that case the modern approach is to offer data services through a RESTful API.
- Technology – The main integration pattern will not change as explained above. The exception being where new interface development is required (e.g., possibly Unitrax to Multifonds), cloud technologies should be considered to align with the enterprise strategy. This project will employ IIA as mentioned above in point # 2. As such any new technology introduced by Seg Fund interfaces will have to be integrate with IIA.

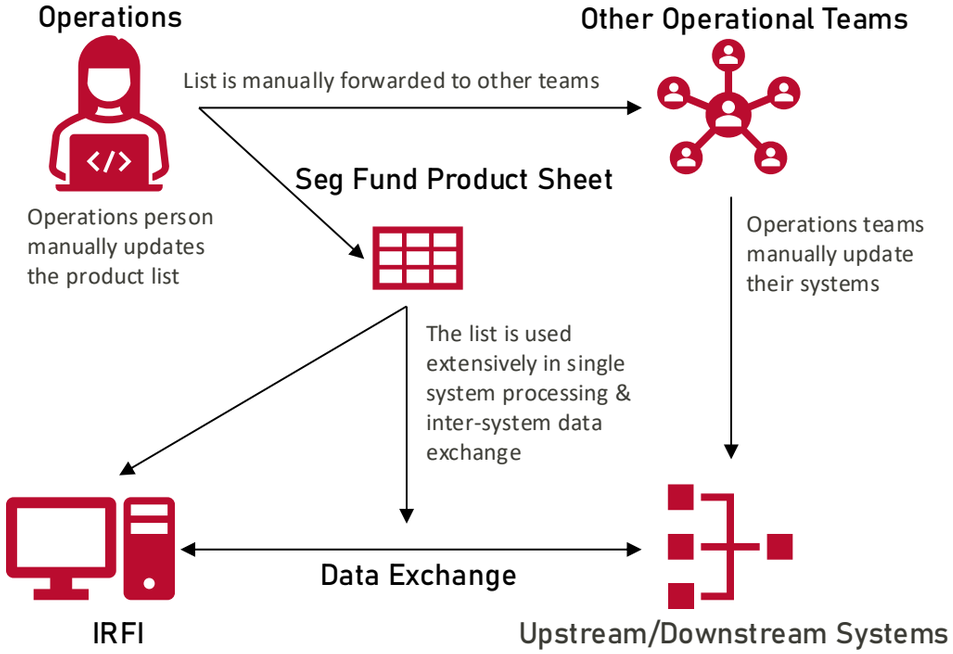
Strategic Direction

- ✓ Modernize the interfaces is the preferred option to fulfil the project mandate as well as to improve and align with the Investments integration patterns and infrastructure
- ✓ Any modernizing should be done from a holistic enterprise perspective rather than as a collection of point-to-point solutions.
- ✓ The IIA pattern should be mostly reused but they should be complimented by newer patters such as RESTful data APIs in specific integrations where this is warranted and with new technologies if required

Appendix

A Case For Enterprise Product Repository

Current State



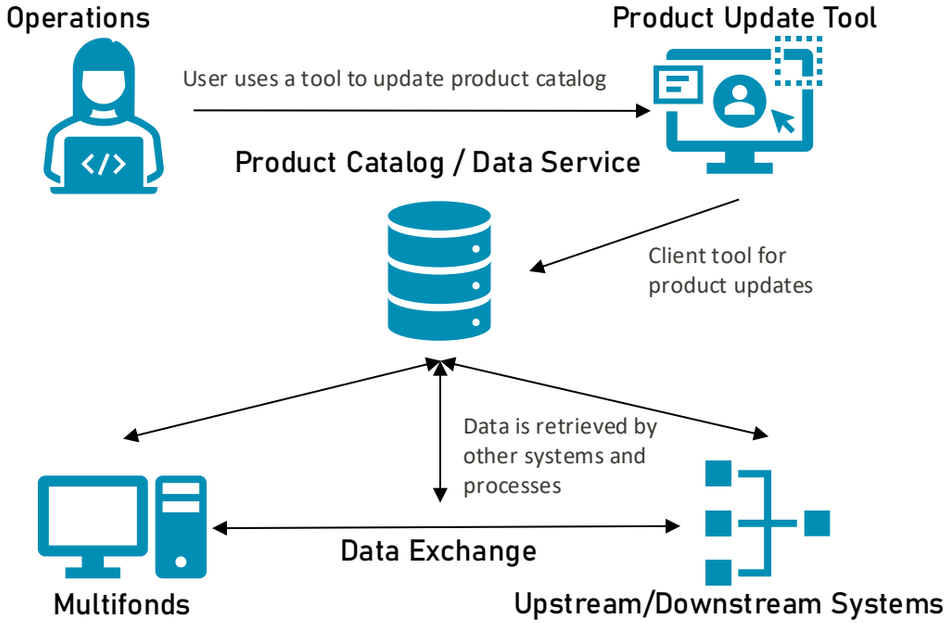
PROs

- BAU, familiar process for the product maintenance users

CONs

- No BoR for the firm for its core products, the product list is more like a user's local data that they are willing to share with others
- Non-secure, error-prone, time-consuming, requires human co-ordination, not reliable, difficult to change and/or correct errors
- Unprofessional in this day-end-age
- Allows for different product ID schemes in different systems which makes inter-system product mapping necessary
- Contrary to firm's business and technical directives where enterprise data should be secure, shared and easily available

Future State



PROs

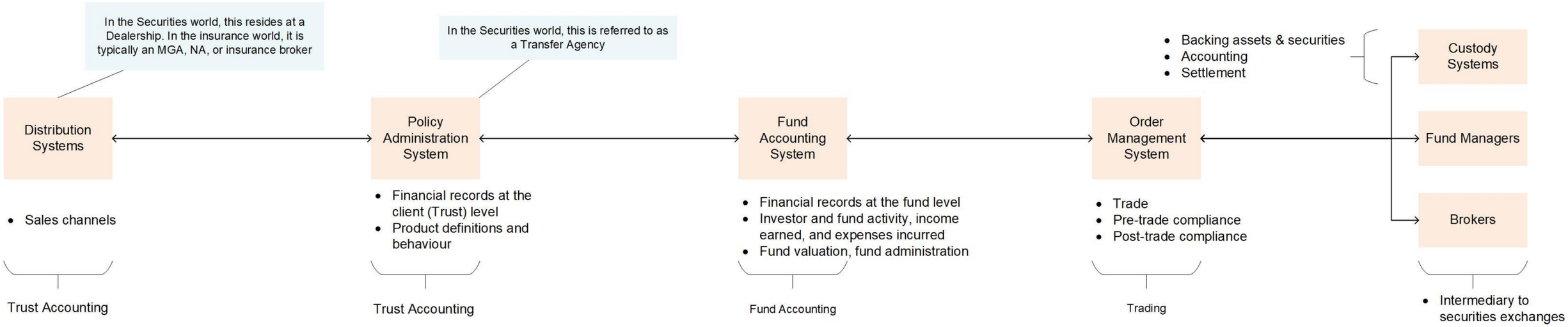
- Standard architecture pattern for enterprise BoR data
- Aligns with modern technology patterns
- Offers better security, availability, management and governance of data
- Allows for single product identification scheme or simplified mapping among the schemes

CONs

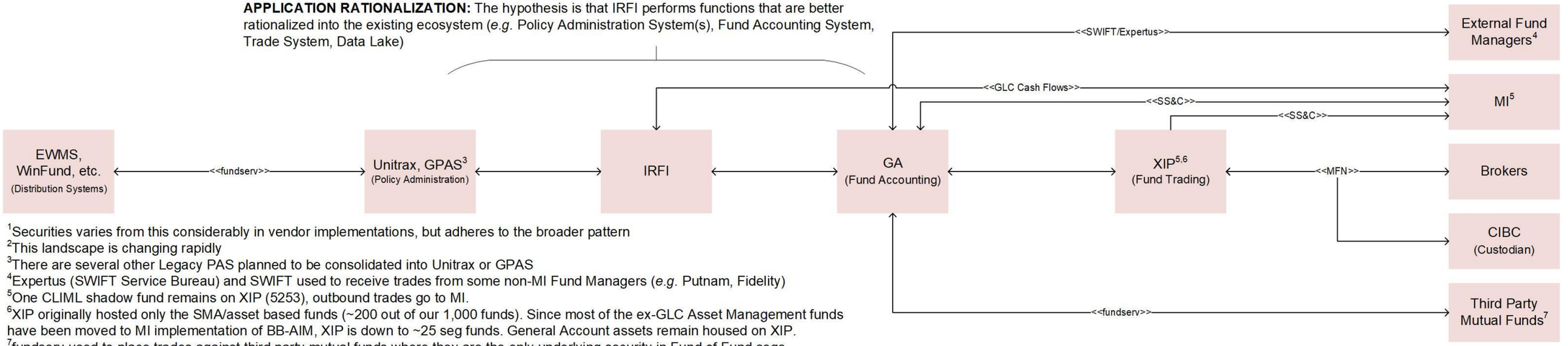
- New pattern in this business segment
- Might require new infrastructure
- Might be expensive and time-consuming to implement

Seg Fund End to End

Generalized Industry Pattern



CL Seg Fund Implementation[1,2]



[1]Securities varies from this considerably in vendor implementations, but adheres to the broader pattern
[2]This landscape is changing rapidly
[3]There are several other Legacy PAS planned to be consolidated into Unitrax or GPAS
[4]Expertus (SWIFT Service Bureau) and SWIFT used to receive trades from some non-MI Fund Managers (*e.g.* Putnam, Fidelity)
[5]One CLIML shadow fund remains on XIP (5253), outbound trades go to MI.
[6]XIP originally hosted only the SMA/asset based funds (~200 out of our 1,000 funds). Since most of the ex-GLC Asset Management funds have been moved to MI implementation of BB-AIM, XIP is down to ~25 seg funds. General Account assets remain housed on XIP.
[7]fundserv used to place trades against third party mutual funds where they are the only underlying security in Fund of Fund segs