NORTHERN TRUST

ASSET SERVICING

Asset Servicing Digital Update Q1 2023

APRIL 2023

Execution in Action for 2023 – Data and Digital Execution Focus

Enhancing the overall client experience with the evolution of our digital ecosystem

Institutional Passport Portfolio Valuation Modernization Deliver a new set of core experiences across a suite of pages in our Portfolio Valuation & Exposure offerings with enhanced visual depiction of data

Released **Client Digital Metrics Dashboards** to improve awareness of client usage and experiences across our digital servicing channels

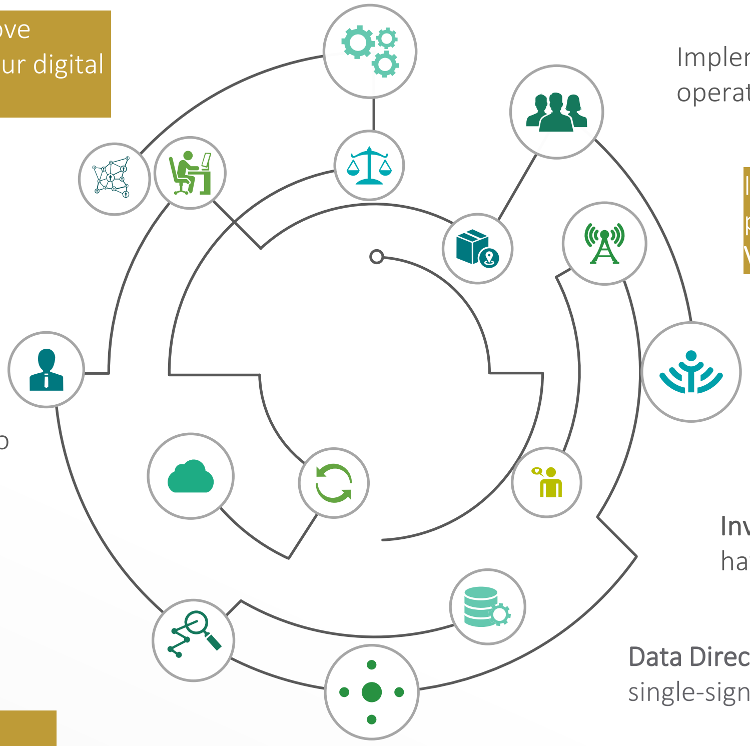
Implemented **IRAS Market Risk** and **ESG data** in **RADAR** application

Expanded **Strategic Data Sets** available for consumption via **Data Warehouse Files**

Launched **Data Warehouse Solutions** which allow clients to leverage **Strategic Data Sets** and obtain bespoke data views into their Warehouse or applications via **API**

Partnering with **Snowflake** on Data Warehouse Solutions initiatives

Launched **Settlement Monitor** providing timely, insightful data to enhance monitoring of settlements



Implemented **Behavioural Analytics** and **Fund Peek Through** operational support teams.

Implemented **Security Governance Module** providing transparency into **KPIs**, **SLAs** and **Market Value Differences** between books of record.

Implementation of enhanced **Passport Security Authentication and Architecture** leveraging industry leading security infrastructure

Investment Performance APIs offered by IRAS have been migrated to the API Store.

Data Direct added to the suite of applications we offer single-sign security authentication capability.

API Store recognized as "**Best Data Management Initiative**" by Waters Technology American Financial Technology Awards.

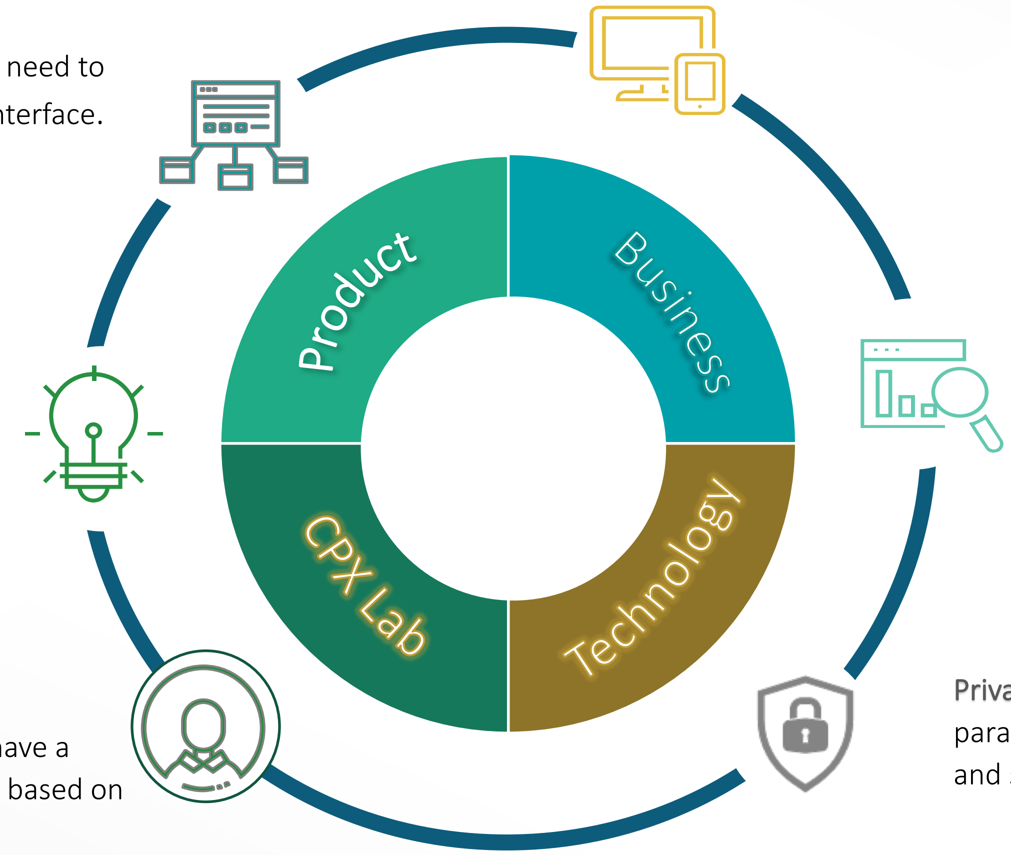
Our Digital Tenets

Access Anywhere - Providing multi channel data solutions across web applications, mobile and APIs to deliver a flexible and consistent client experience.

Enhanced Efficiency - Shortening the time from need to fulfillment. Designing a simple and intuitive user interface.

Knowledge from Numbers - Using technology to tailor the data tsunami, making it relevant, and providing depth on demand only when needed

Client Centric Solutions - Ensuring solutions have a view from the outside in, providing solutions based on client business needs and objectives



Analytical Awareness - A new generation of customizable digital tools that personalize experiences, optimizes data and allows the freedom to focus on what really matters.

Privacy & Security- Data privacy concerns are paramount. We continue to strengthen our privacy and security.

Institutional Investor Passport

Status: Client Beta

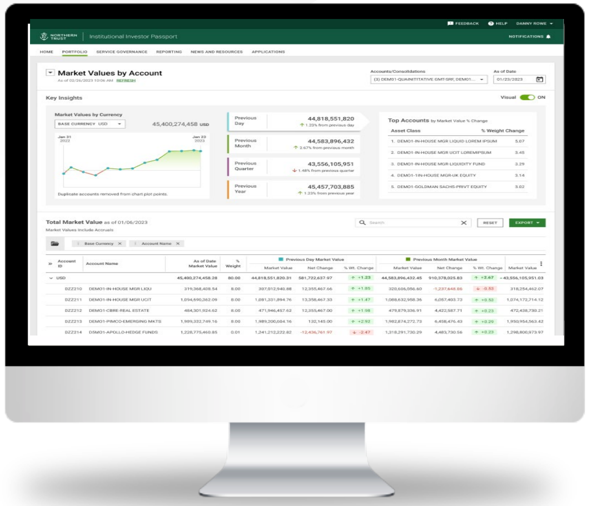
Target Release May 2023

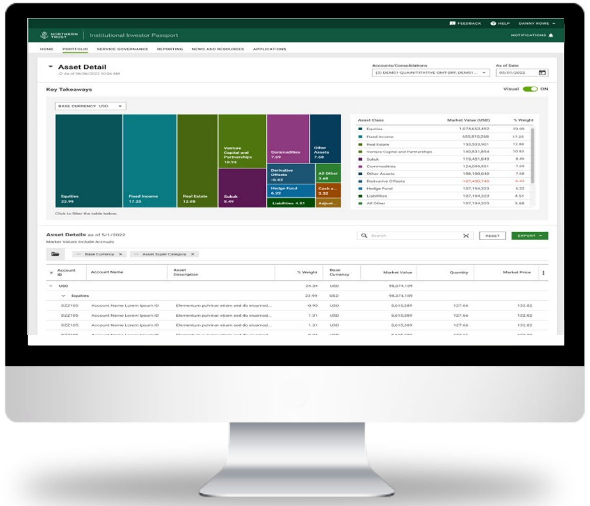
New Portfolio Valuation Pages

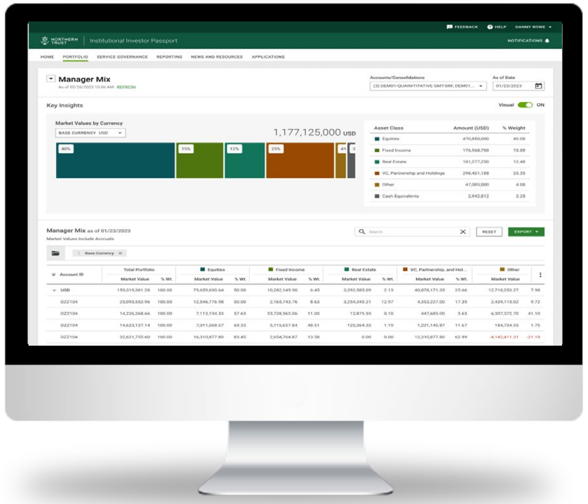
Delivering digital solutions to support core client decisions

Key Features

- New digital interface designed to promote portfolio insights through improved visualization of data
- Leverages NT Human Centered Design approach to provide a modernized, interactive client experience
- Flexibility to customize data layout and group content according to user preference
- Filters and sorting simplify interaction with account data
- Supports both single account and consolidated views
- New responsive design provides flexibility to view in desktop, tablet and mobile experiences
- Accessibility compliant user interface







Status: Client Beta

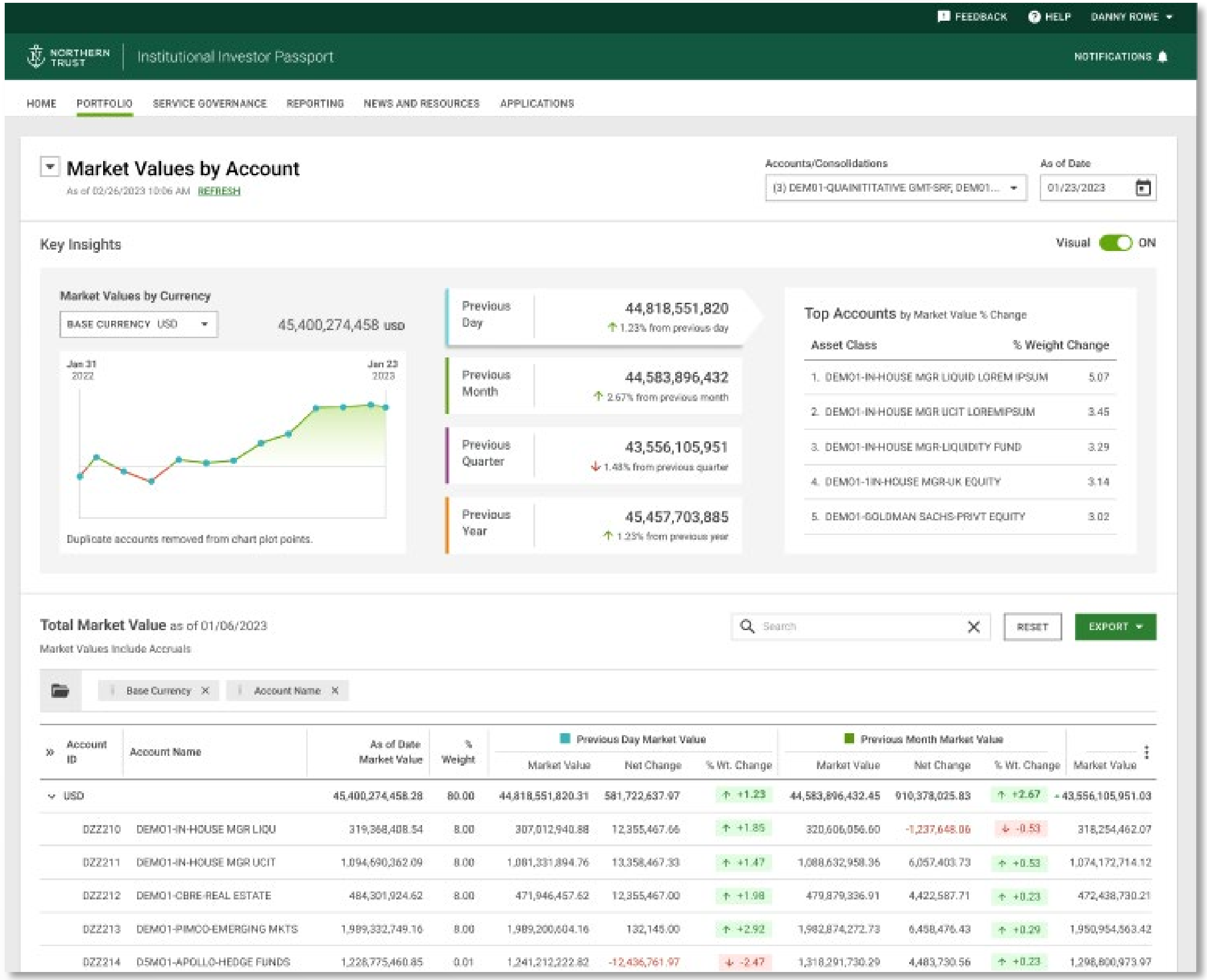
Target Release May 2023

Portfolio Valuation – Market Values by Account

Delivering digital solutions to support core client decisions

Key Features

- Depicts breakdown of accounting-based valuations
- Charting represents breakdown of market value comparisons to previous time periods by selected base currency
- Table data includes
  - As of Date Market Value
  - Weight
  - Net Change
  - Percent Change
- View across various base currencies when multiple accounts are selected



Status: Client Beta

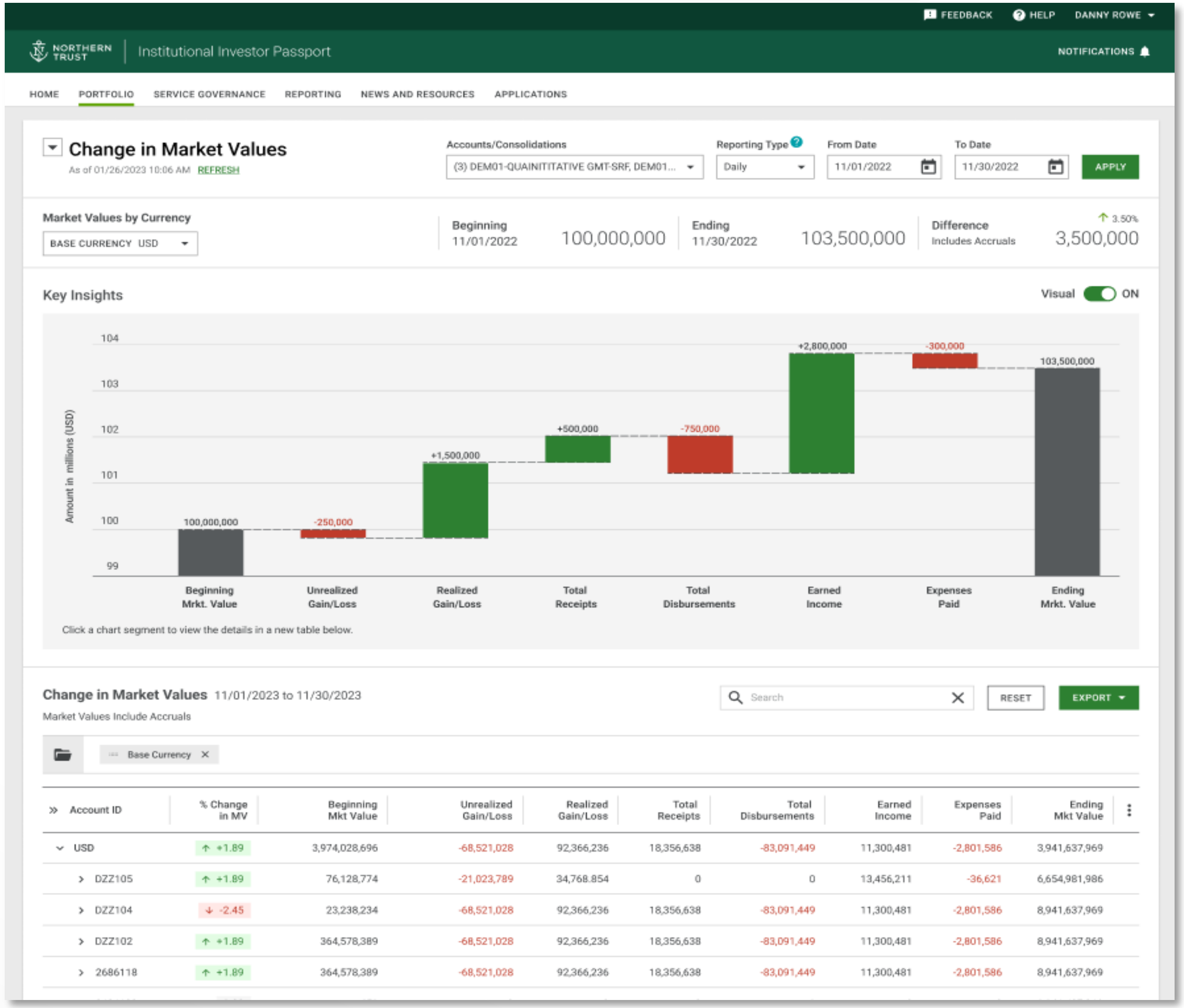
Target Release May 2023

Portfolio Valuation – Change in Market Values

Delivering digital solutions to support core client decisions

Key Features

- Depicts breakdown of accounting-based investment valuations
  - Component data includes
    - ✓ Beginning/Ending Market Values
    - ✓ Unrealized Gains/Losses
    - ✓ Realized Gains/Losses
    - ✓ Total Receipts
    - ✓ Total Disbursements
    - ✓ Earned Income
    - ✓ Expenses Paid
    - ✓ User defined period of concentration provides flexibility to analyze across custom dates
- User defined period of concentration provides flexibility to analyze across custom dates
- View across various base currencies when multiple accounts are selected
- Future phase would introduce new APIs that provide enhanced drill down



Status: Client Beta

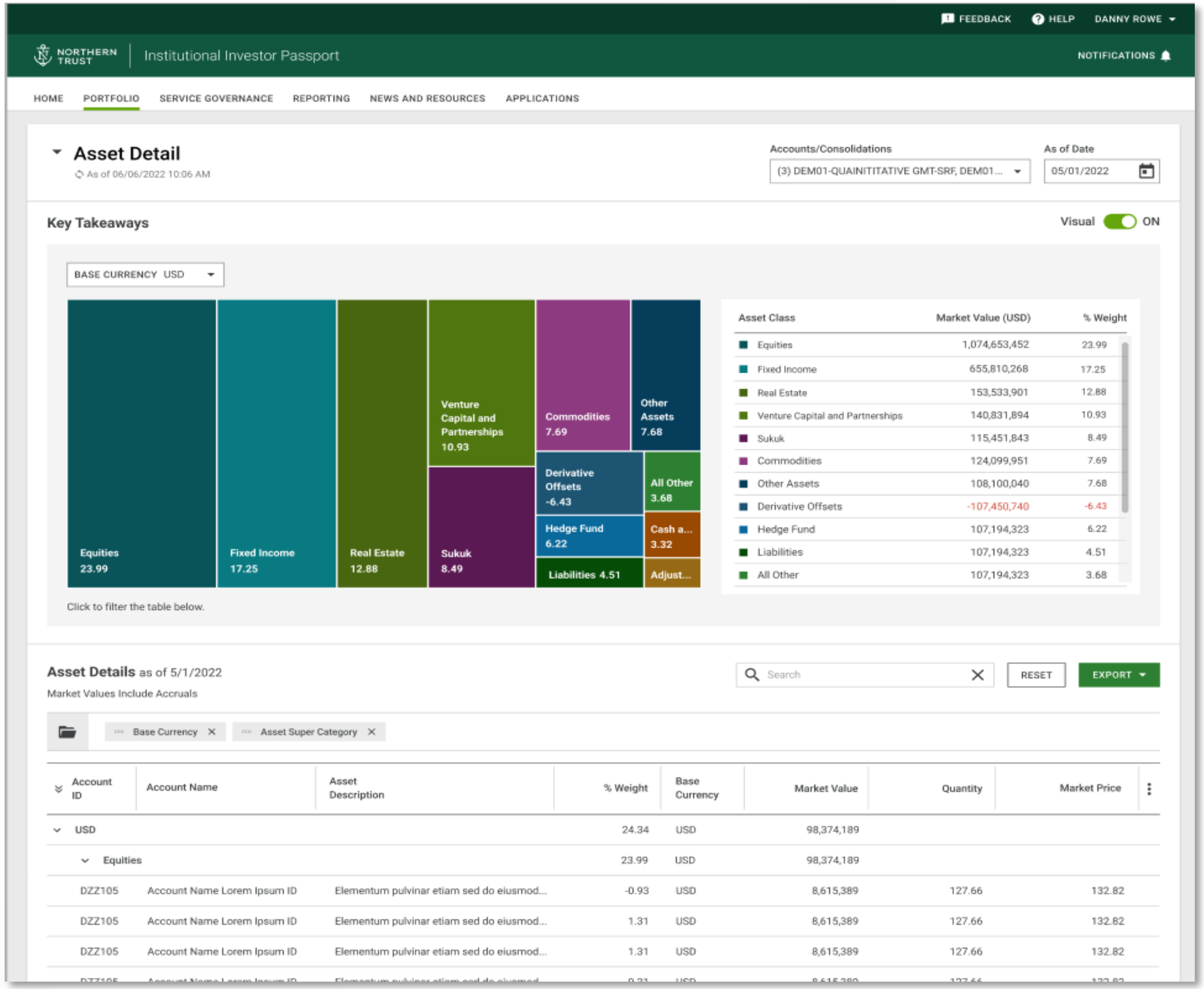
Target Release May 2023

Portfolio Valuation – Asset Detail

Delivering digital solutions to support core client decisions

Key Features

- Tree map view of exposure across asset classes
- Component data includes
  - ✓ Asset Description
  - ✓ Quantity
  - ✓ Ending Market Values
  - ✓ Percent Weight
  - ✓ Unrealized Gains/Losses
  - ✓ Cost
  - ✓ Asset Super Category
  - ✓ Asset Sub-Category
- View across various base currencies when multiple accounts are selected.

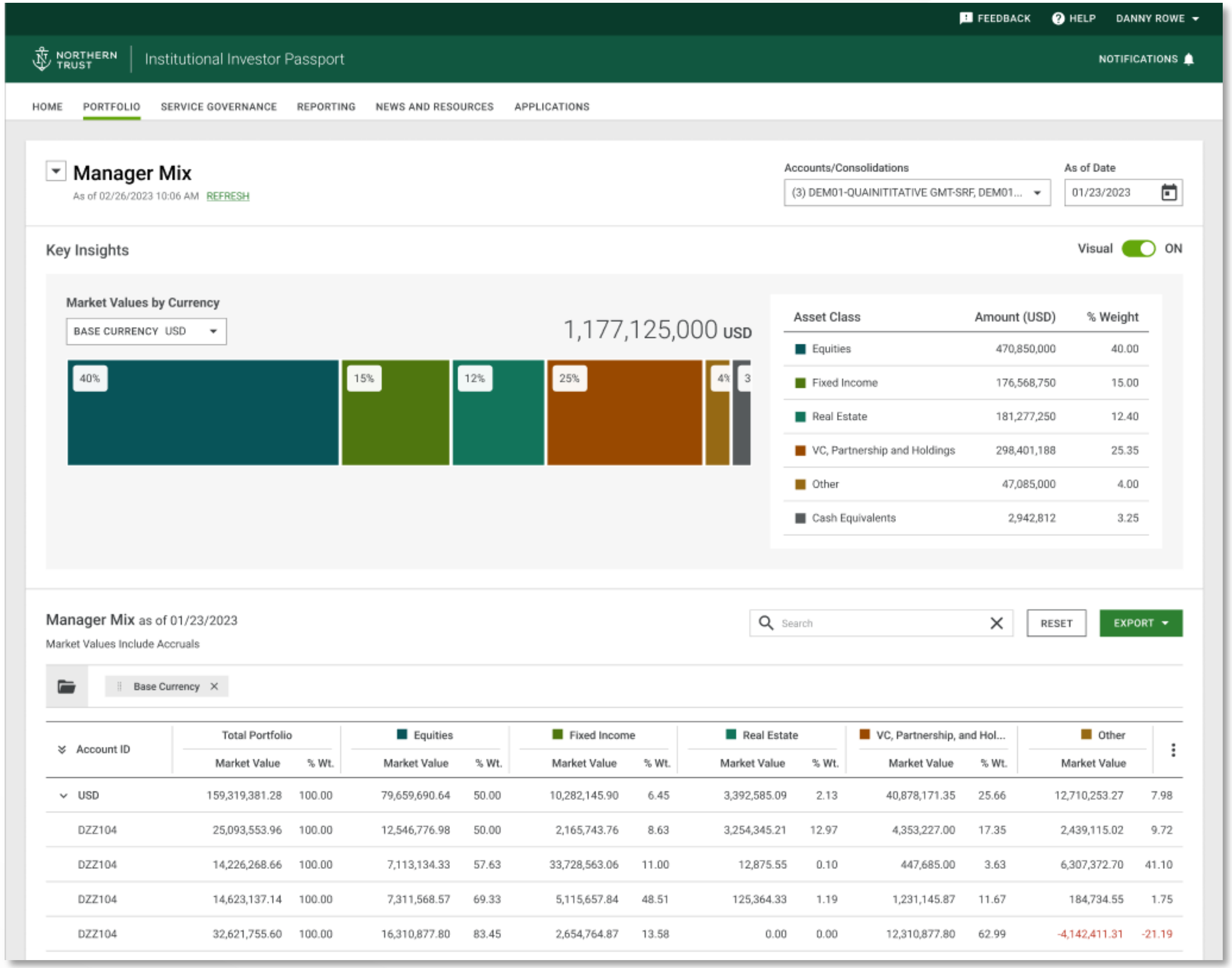


Portfolio Valuation – Manager Mix

Delivering digital solutions to support core client decisions

Key Features

- Horizontal Bar Chart view of exposure across asset classes
- Component data includes:
  - Ending Market Values
  - % Weight
    - ✓ Total Portfolio
    - ✓ Equities
    - ✓ Fixed Income
    - ✓ Real Estate
    - ✓ VC, Partnerships & Hedge Funds
    - ✓ Cash Equivalents
    - ✓ Other
- View across various base currencies when multiple accounts are selected various base currencies when multiple accounts are selected



Status: Client Beta

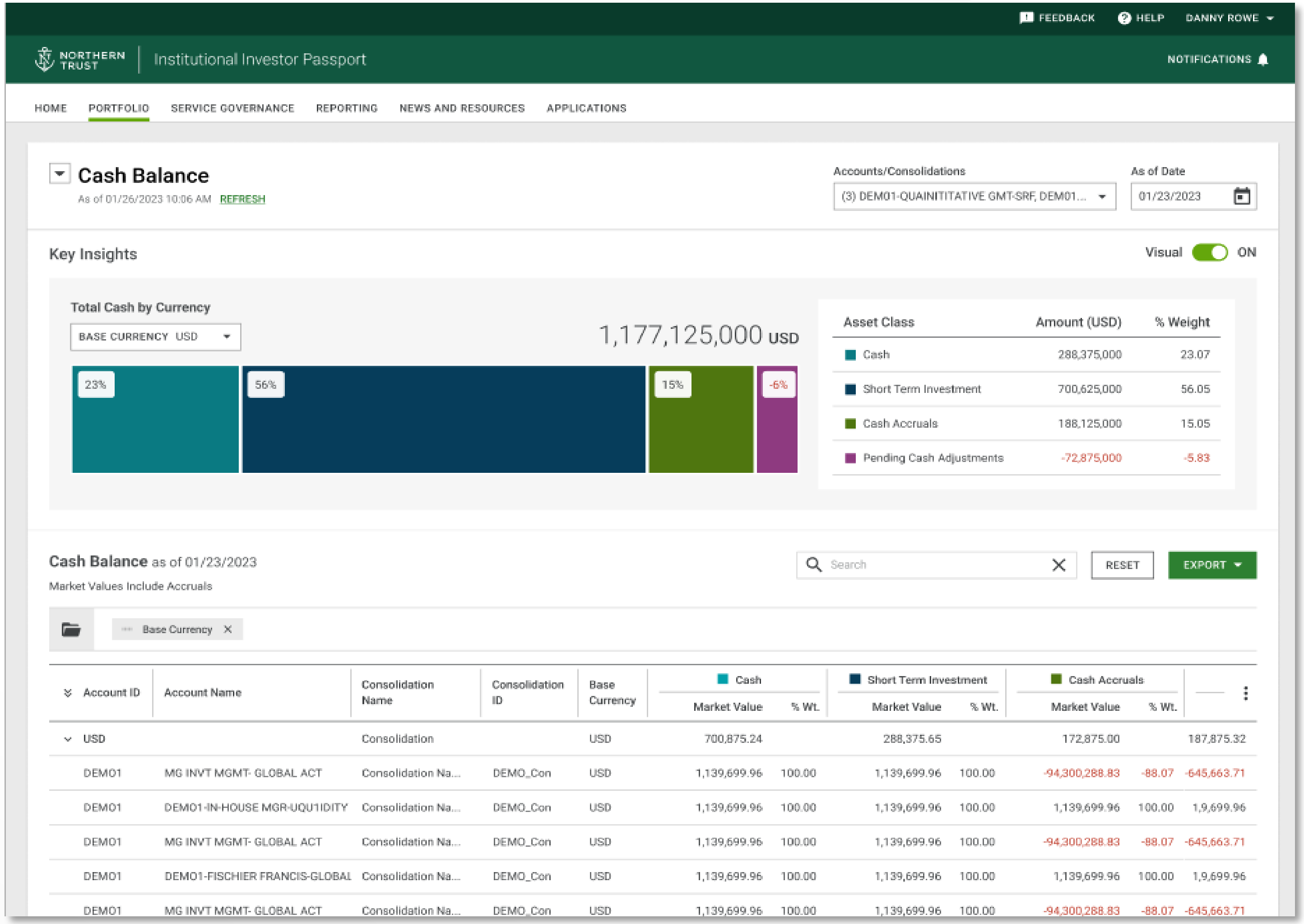
Target Release May 2023

Portfolio Valuation – Cash Balance

Delivering digital solutions to support core client decisions

Key Features

- Horizontal Bar Chart view of exposure across cash categories
- Component data includes
  - Ending Market Values
  - % Weight
    - ✓ Total Cash
    - ✓ Cash
    - ✓ Short Term Investments
    - ✓ Pending Cash Adjustments
    - ✓ Cash Accruals
- View across various base currencies when multiple accounts are selected



Status: Client Beta

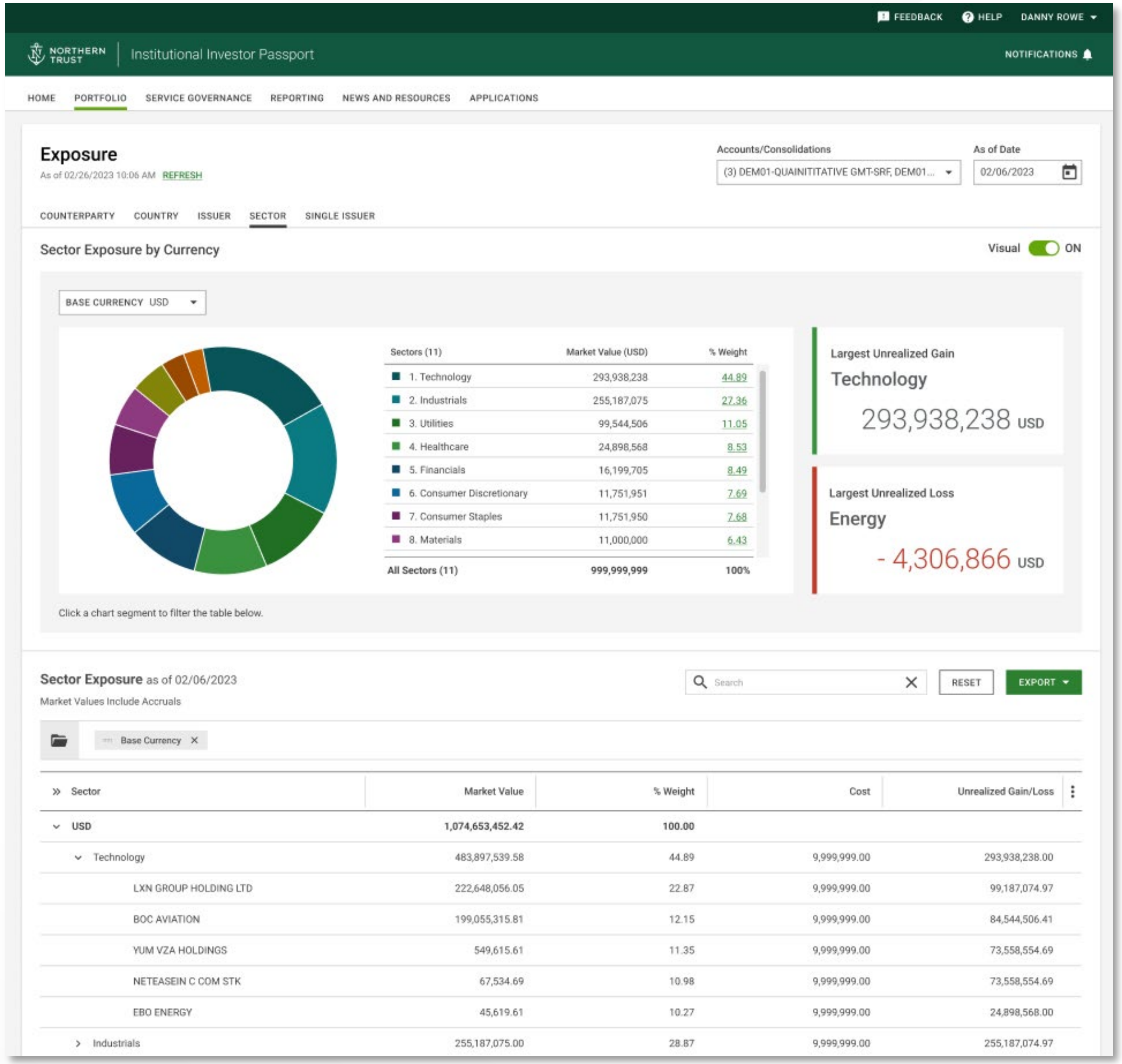
Target Release May 2023

Portfolio Valuation – Sector Exposure

Delivering digital solutions to support core client decisions

Key Features

- Exposure views across Sector, Countries, Issuers and Counterparties
- Can be viewed across a single account or multiple accounts/consolidations
- Visual Cards easily identify asset class with Largest Unrealized Gain / Loss
- Content is exportable to Excel



Status: Client Beta

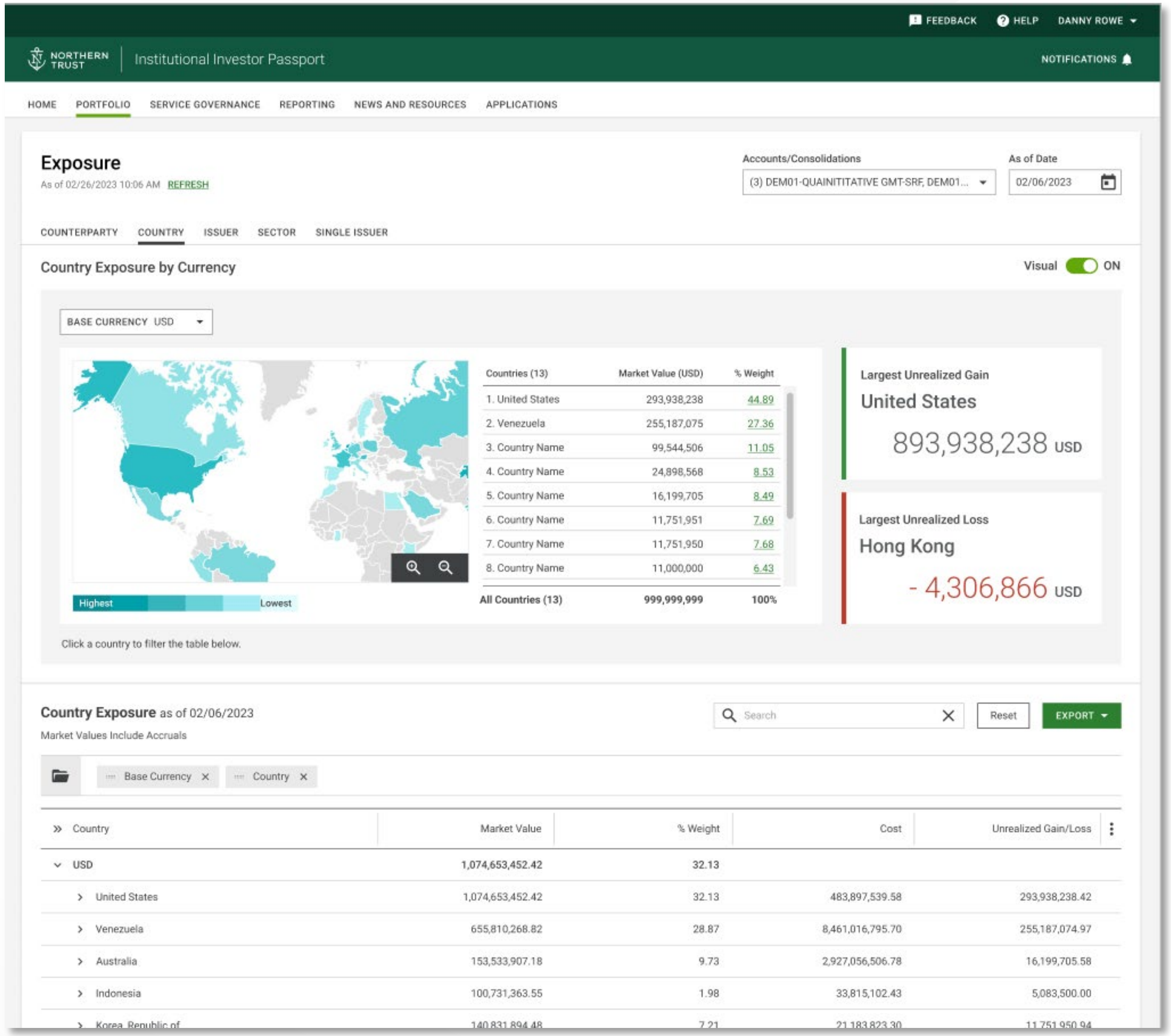
Target Release May 2023

Portfolio Valuation – Country Exposure

Delivering digital solutions to support core client decisions

Key Features

- Exposure views across Sector, Countries, Issuers and Counterparties
- Can be viewed across a single account or multiple accounts/consolidations
- Visual Cards easily identify asset class with Largest Unrealized Gain / Loss
- Content is exportable to Excel



Status: Client Beta

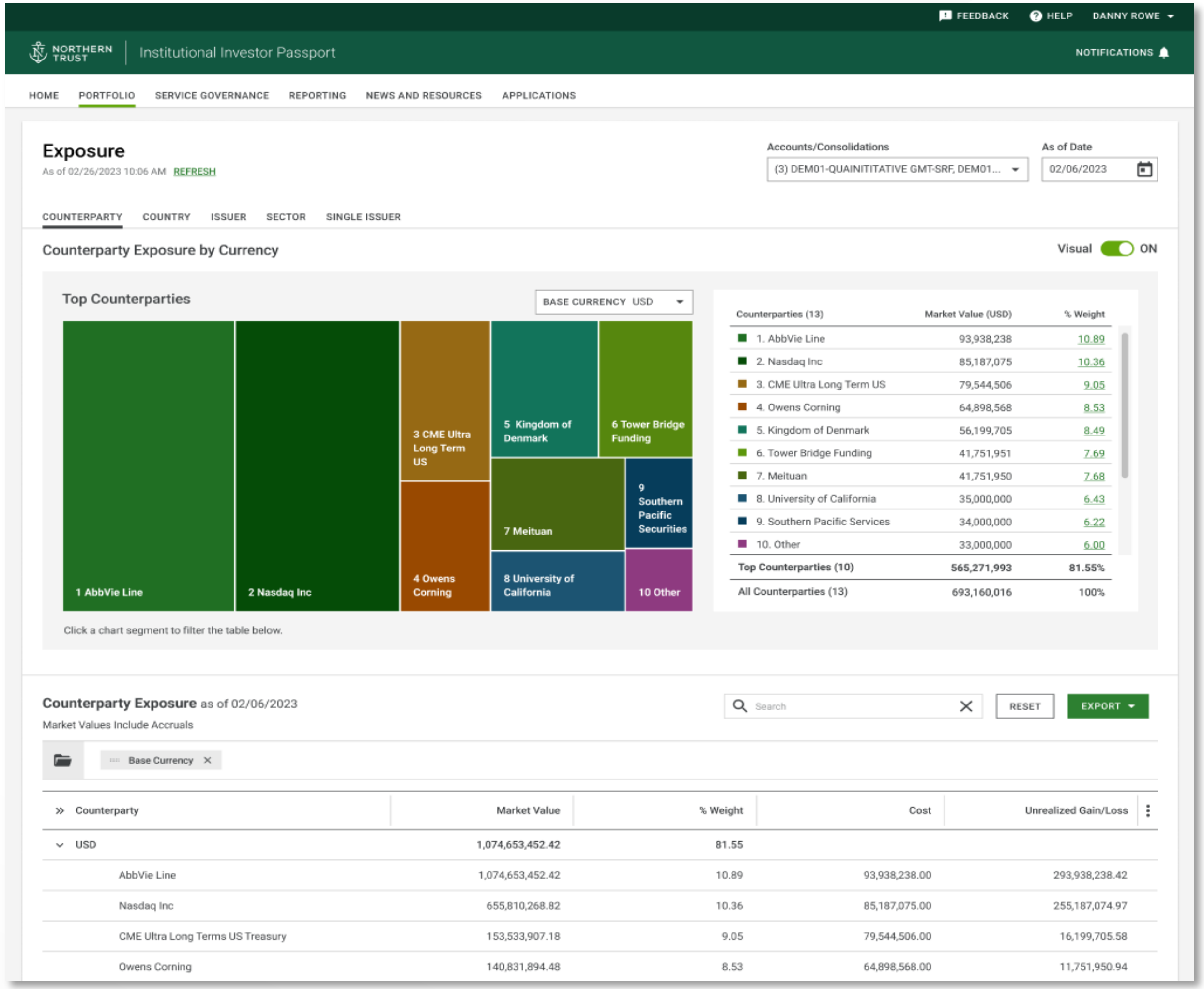
Target Release May 2023

Portfolio Valuation – Issuer and Counterparty Exposure

Delivering digital solutions to support core client decisions

Key Features

- Release May ‘23
- Exposure views across Sector, Countries, Issuers and Counterparties
- Can be viewed across a single account or multiple accounts/consolidations
- Visual Cards easily identify asset class with Largest Unrealized Gain / Loss
- Content is exportable to Excel

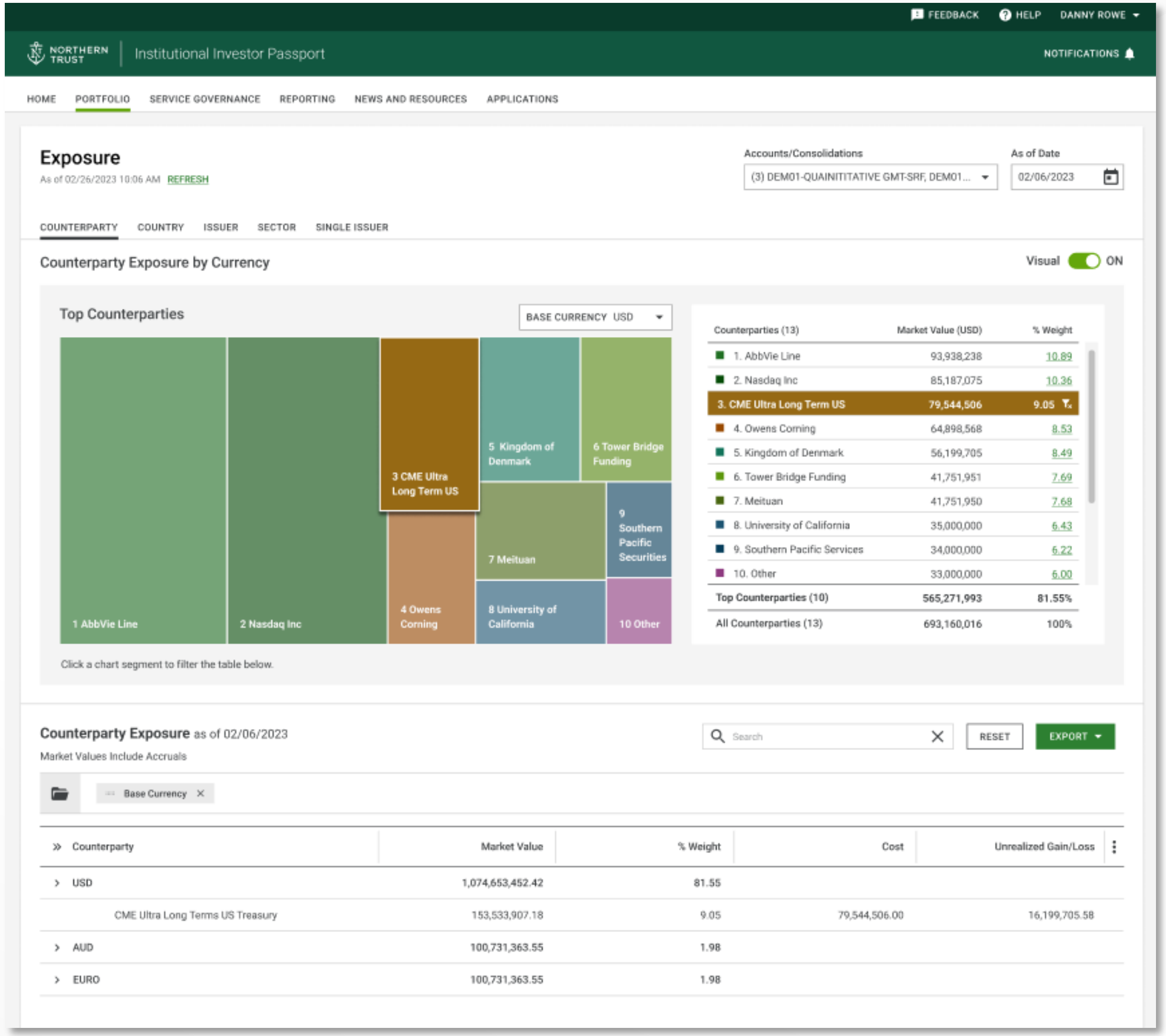


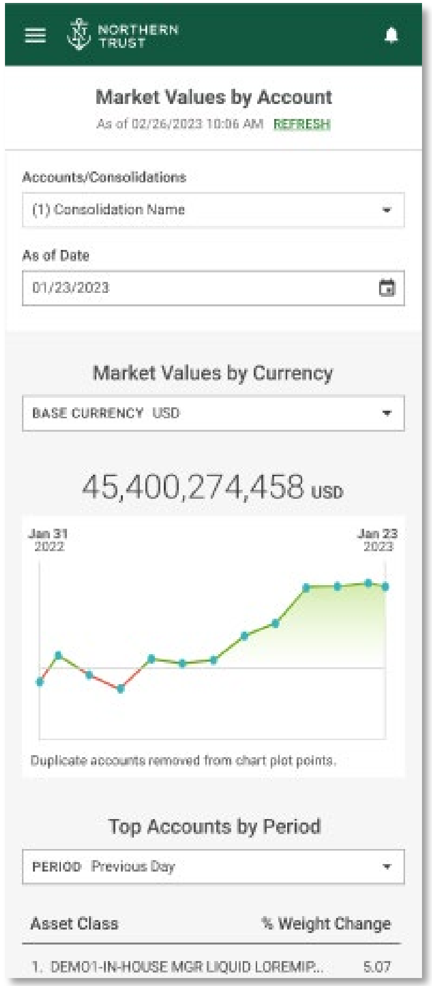
Portfolio Valuation – New features coming in 2023

Delivering digital solutions to support core client decisions

Targeted Features

- Introduce click on visual charting to filter table data
- Change in Market Value page will include drill down feature allowing users to interrogate chart to view transactional data
- Mobile / responsive view will improve usability on phones and tablets
- Additional cosmetic / usability improvements





Securities Services

Securities Services

Enhancing our online digital experience to provide clients additional tools to monitor their custody portfolios

Strategic Vision

Enhance the Digital Client Securities Services experience to provide consistency and transparency into client data and analytics while increasing productivity for clients and Northern Trust partners alike.

Key Features

- Reduced fragmentation across a user's experience
- Enhanced visualizations designed for interactive experience
- Reduced manual reporting complexities
- Improved analytics & data automation
- Improved self-service

Securities Services

Settlement Monitor Dashboard

Custody KPI Tracker Dashboard

Manager Reconciliation Dashboard

Corporate Actions Delivery & Response (CDR)

Digital Concierge Integration

Future deliverables include Securities Services Home Page, Tax Monitor, Digital Assets

Available Now

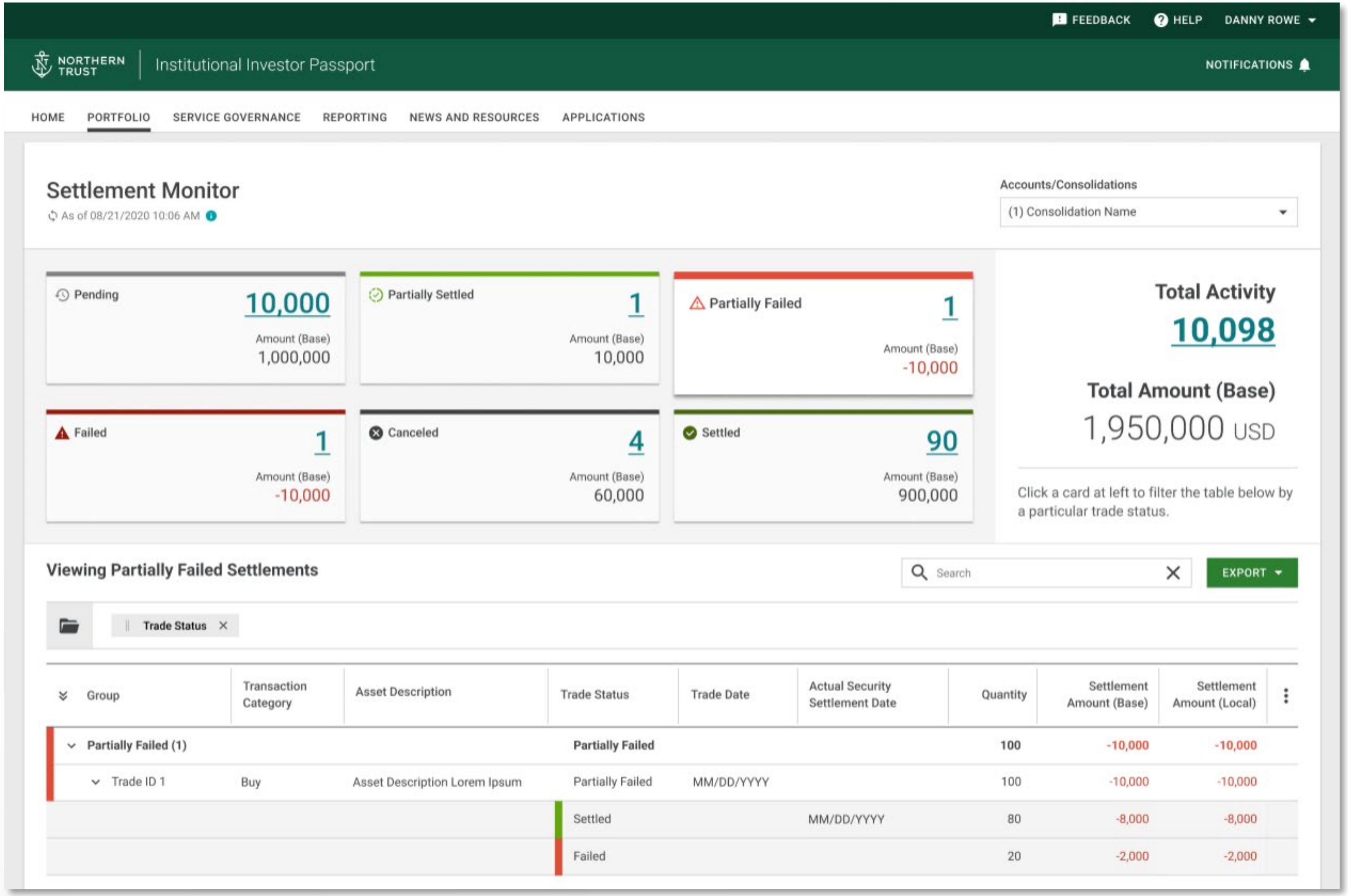
Settlement Monitor

Delivering timely, insightful data to enhance client monitoring of settlements activity

Key Features

- Wealth Passport Integration April ‘23
- New Settlements ORC reports April ‘23
- Enhanced Narratives & Country of Settlement are expected 2Q ‘23
- Partial Status’ delivered 4Q ‘22
- Improved navigation and workflow for more intuitive access to information
- Improved data coverage, quality & timeliness
- Multi-channel and responsive design allows via desktop, tablet, or mobile device

Product Video available



Securities Services Capabilities Catalogue

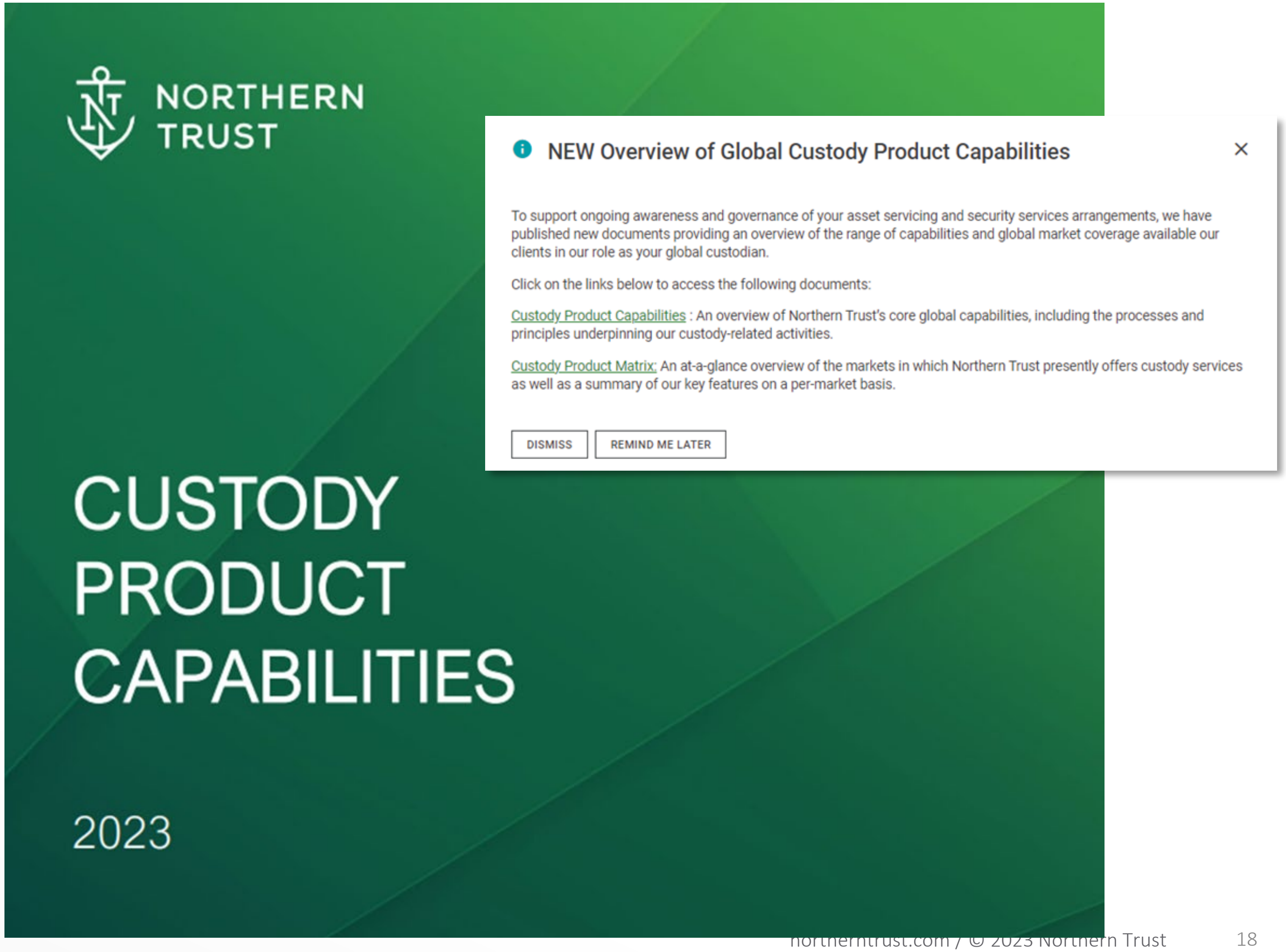
Provides a detailed review of Northern Trust's core capabilities as custodian with input of subject matter expertise from around the organization.

Key Features

The Securities Services Product Capabilities Catalogue provides a detailed review of Northern Trust's core capabilities as custodian with input of subject matter expertise from around the organization and a key focus on the client experience and what to expect from Northern Trust.

This catalogue focuses on these capabilities:

- Market Access and Account Structure
- Trade Communication and Settlement
- Transactions Linked to Foreign Exchange
- Tax Services
- Corporate Actions
- Income-related Services
- Proxy Voting
- Class Actions
- Manager Reconciliations



Service Governance Dashboards

Service Governance Overview

Enhanced monitoring and reporting solutions designed to deliver greater transparency

Key Drivers

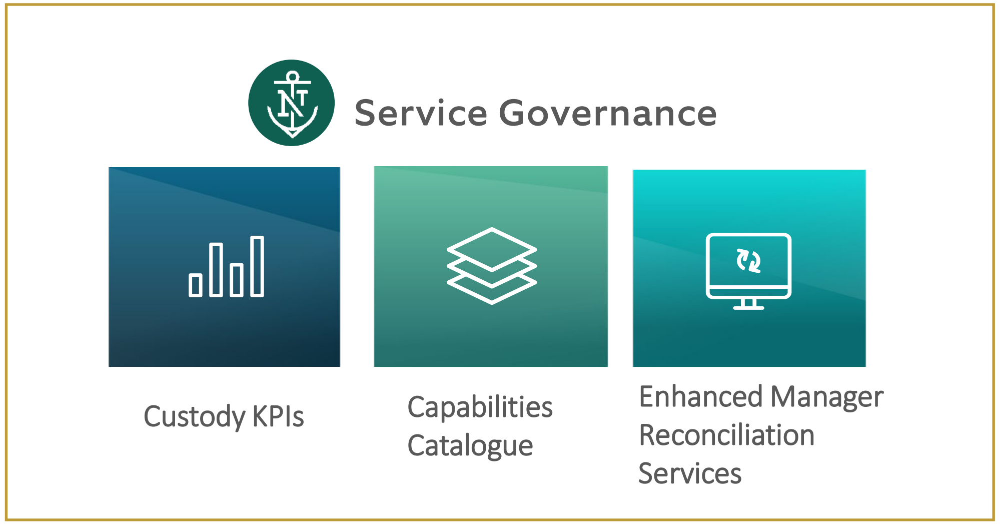
- In an outsourcing business Northern Trust recognizes that transparent KPIs are required to ensure understanding of service quality and value
- Service Governance dashboards enable that transparent record which is part of communication in our service relationship

Capabilities

- Custody Key Performance Indicators
  Interactive custody data points across settlement instructions, settlements, corporate actions, income, and tax reclaims
- Enhanced Manager Reconciliation Services
  Interactive dashboard of Investment Manager vs. Northern Trust's discrepancies
- Capabilities Catalogue
  Detailed profile of all custody capabilities provided. Found in IIP under News & Resources

Key Features

- Enriched data for more transparency
  Contextual information to understand the 'Why'
- Smarter self-service for increased productivity
  Intuitive design to surface the data you need to review
- Ease of customization to meet your specific needs
  Flexible, intuitive interface



Status: Client Beta

Target Release Q2

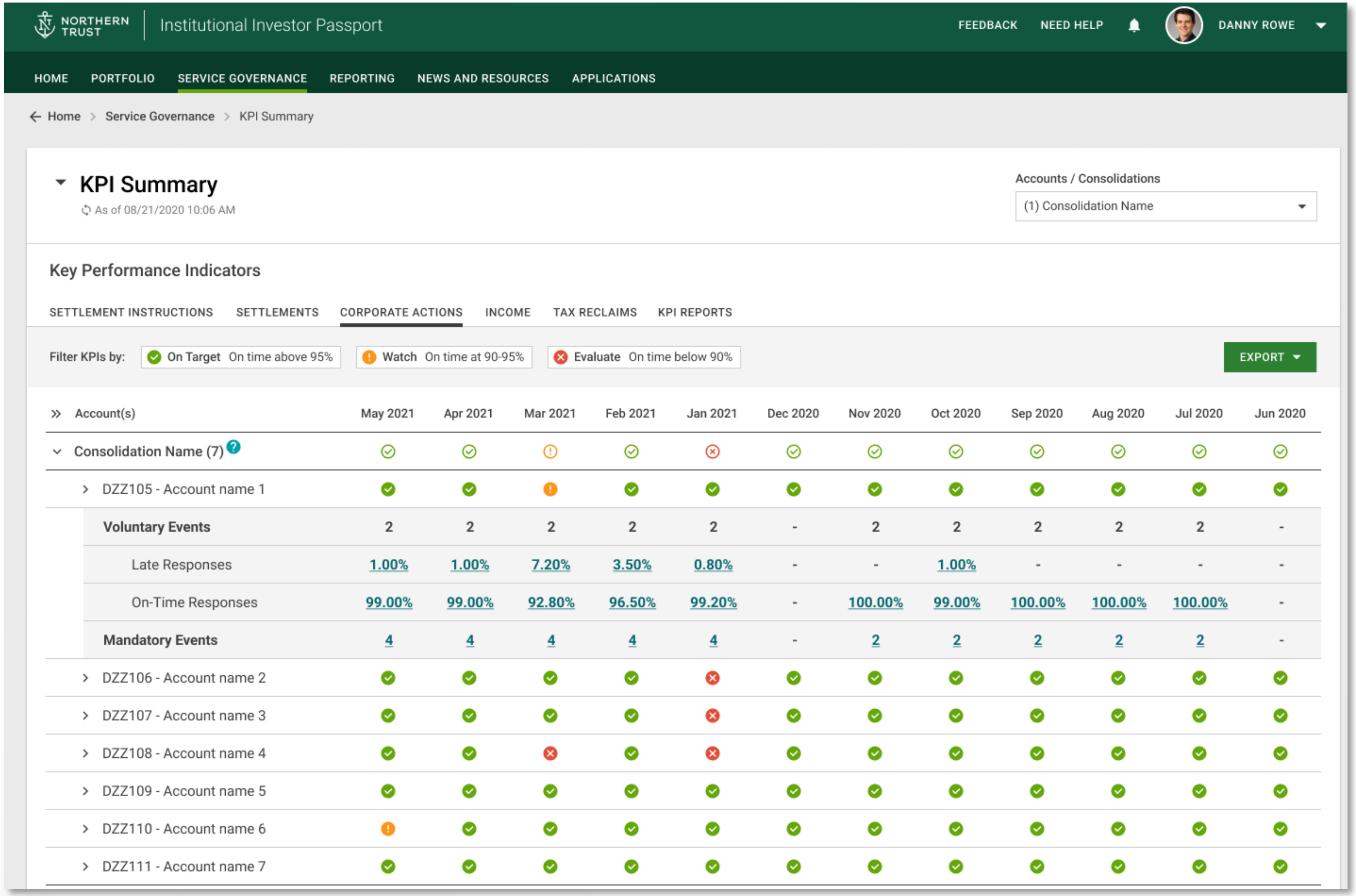
Custody Key Performance Indicators

Provides transparency into your custody key performance indicators through a modern online experience

Key Features

- Ability to measure KPIs across 5 key domains
  - ✓ Settlement Instructions
  - ✓ Settlements
  - ✓ Corporate Actions (2Q ’23)
  - ✓ Income
  - ✓ Tax Reclaims (2Q ’23)
- Provides a stop light approach to easily surface areas of focus – evaluate, watch, and on target
- Review summary, detail, and time series data points based on your specific needs
- Interactive experience to easily drill down to investigate areas of interest
- Details are exportable to Excel

Product Video available



Status: Client Beta

Target Release Q2

Key Performance Indicators – Detailed Views

Provides transparency into your custody key performance indicators through a modern online experience

Key Features

Provides easy access to meaningful insights:

Settlements

- On-Time Settlements
- Failed Settlements (Reasons & Age)
- Canceled
- Interconnected with Settlements Monitor
- What happened vs. What is happening

Settlements Instructions

- Clean (Straight through Processing)
- Manual
- Repaired (Reasons)

Corporate Actions (2Q ’23)

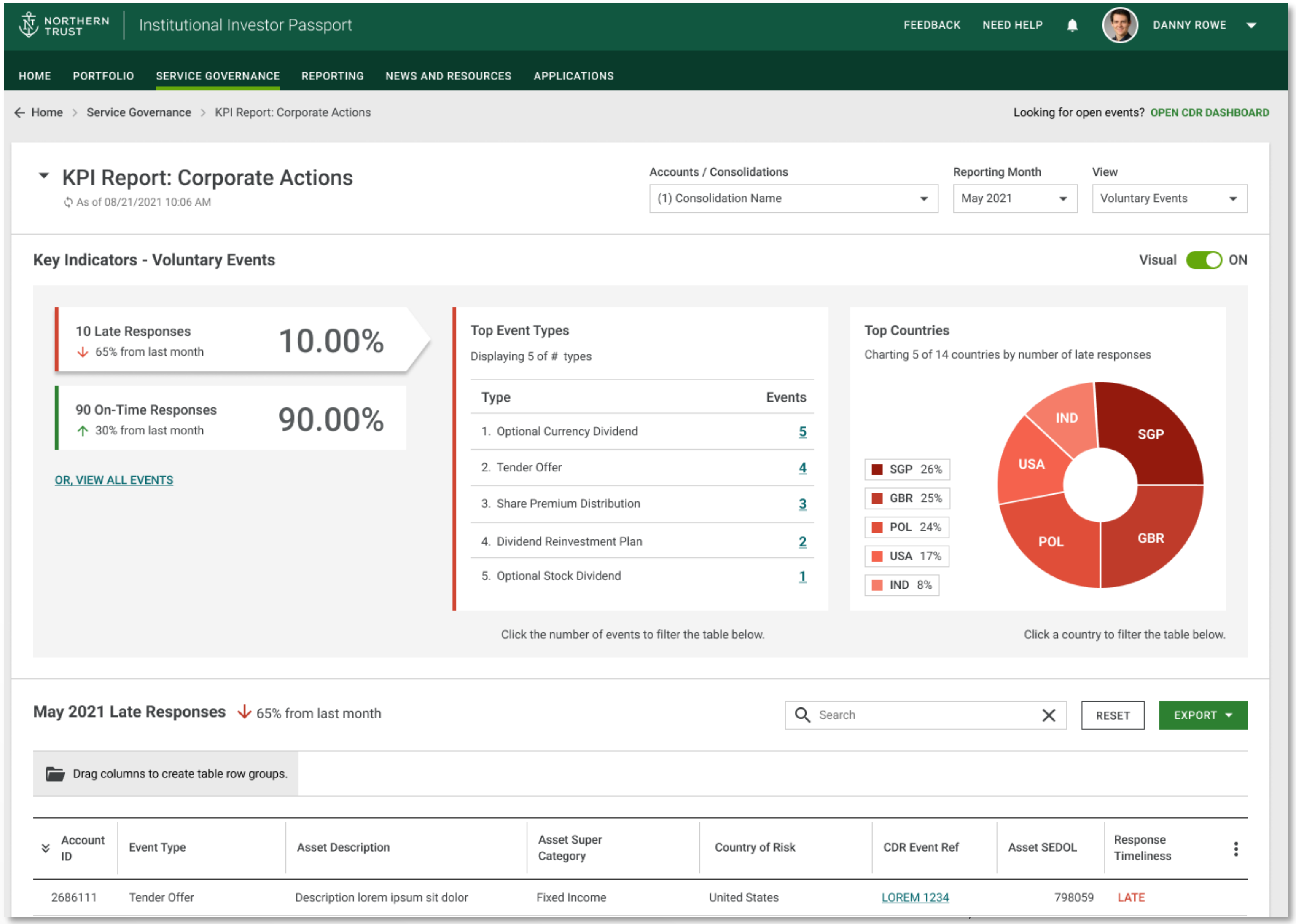
- On-Time/Late Elections for Voluntary Events
- Reporting for Mandatory Events

Income

- On-Time/Late Income Events

Tax Reclaims (2Q ’23)

- On-Time/Late Tax Reclaim Events



Target Release Q2

Key Performance Indicators – Time Series Views

Provides transparency into your custody key performance indicators through a modern online experience

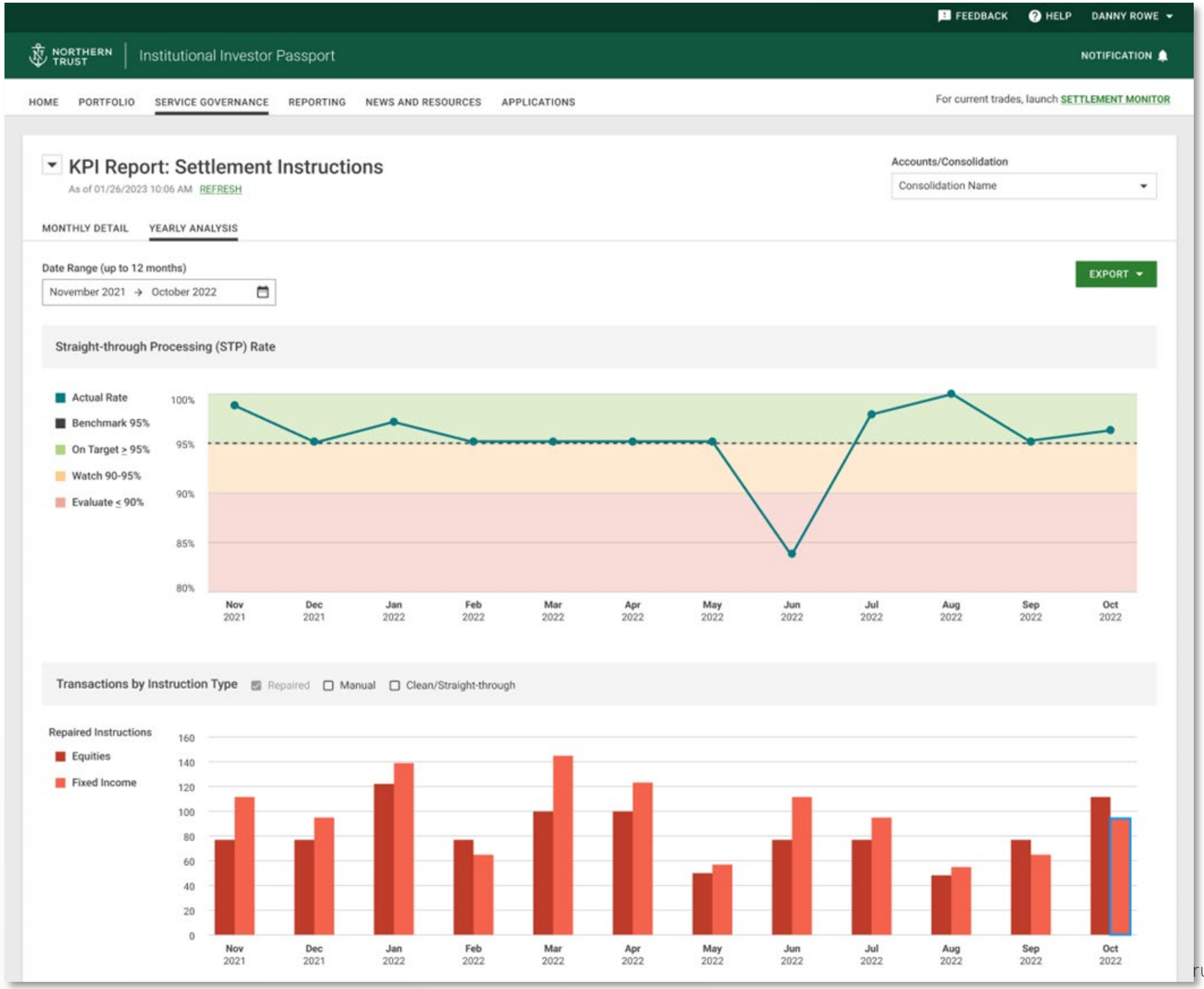
Key Features

Provides easy access to meaningful insights

Expected delivery is 2Q ‘23

Time Series visualizations for:
- ✓ Settlements
- ✓ Settlements Instructions

- Helps detect trends and anomalous information.
- Supports client Board reporting



Custody Key Performance Indicators | Admin Module

Provides transparency into your custody key performance indicators through a modern online experience

Key Features

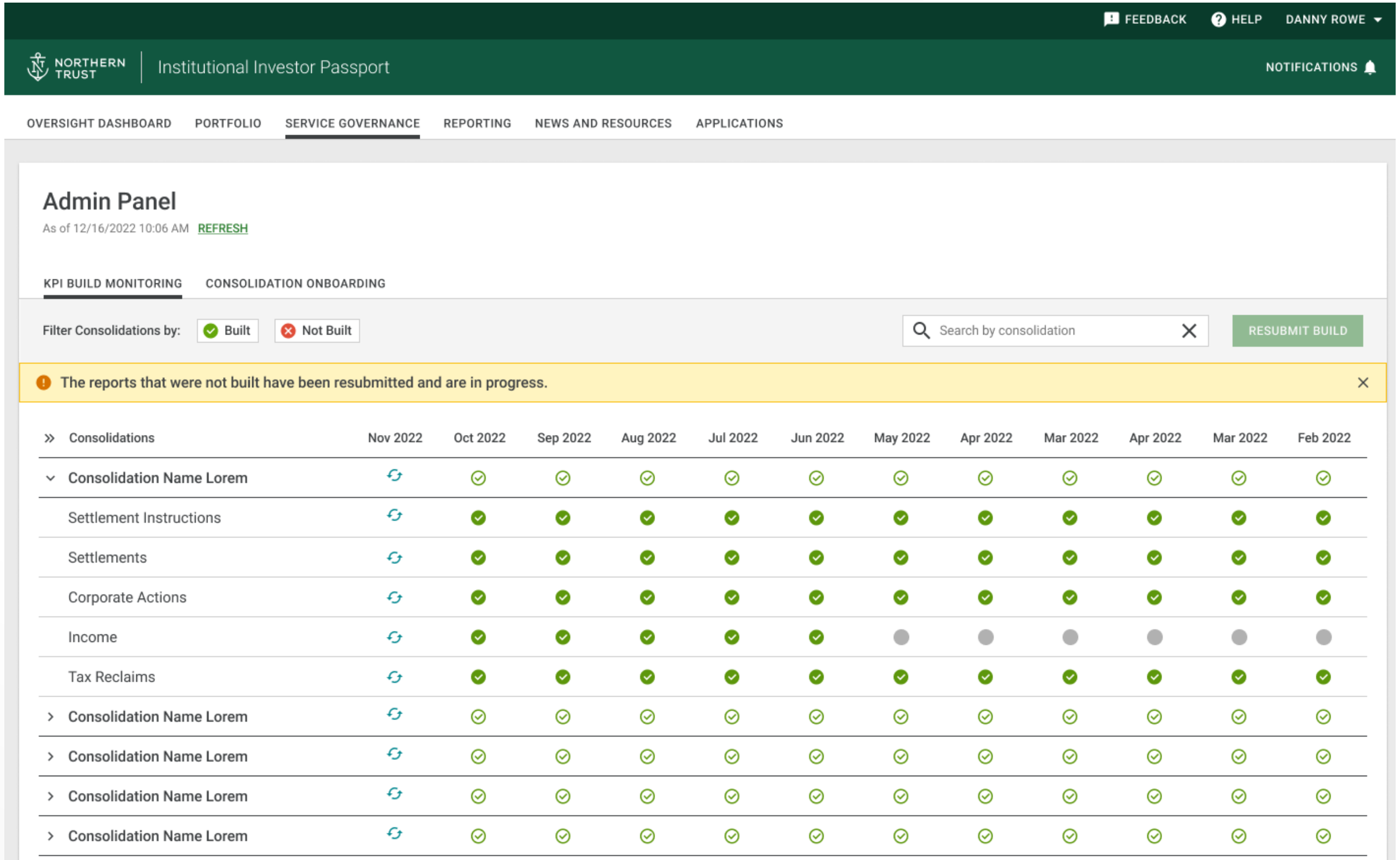
Internal facing only user experience

Delivery is expected May ‘23

Facilitates the On-Time delivery of information

Provides a view across clients and consolidations.

- Consolidation KPI Build Monitoring
- Enables KPI Consolidation Onboarding



Available Now

Enhanced Manager Reconciliation Services

Summary View

At-a- glance views of reconciliations across accounts and trailing 6 or 12 months

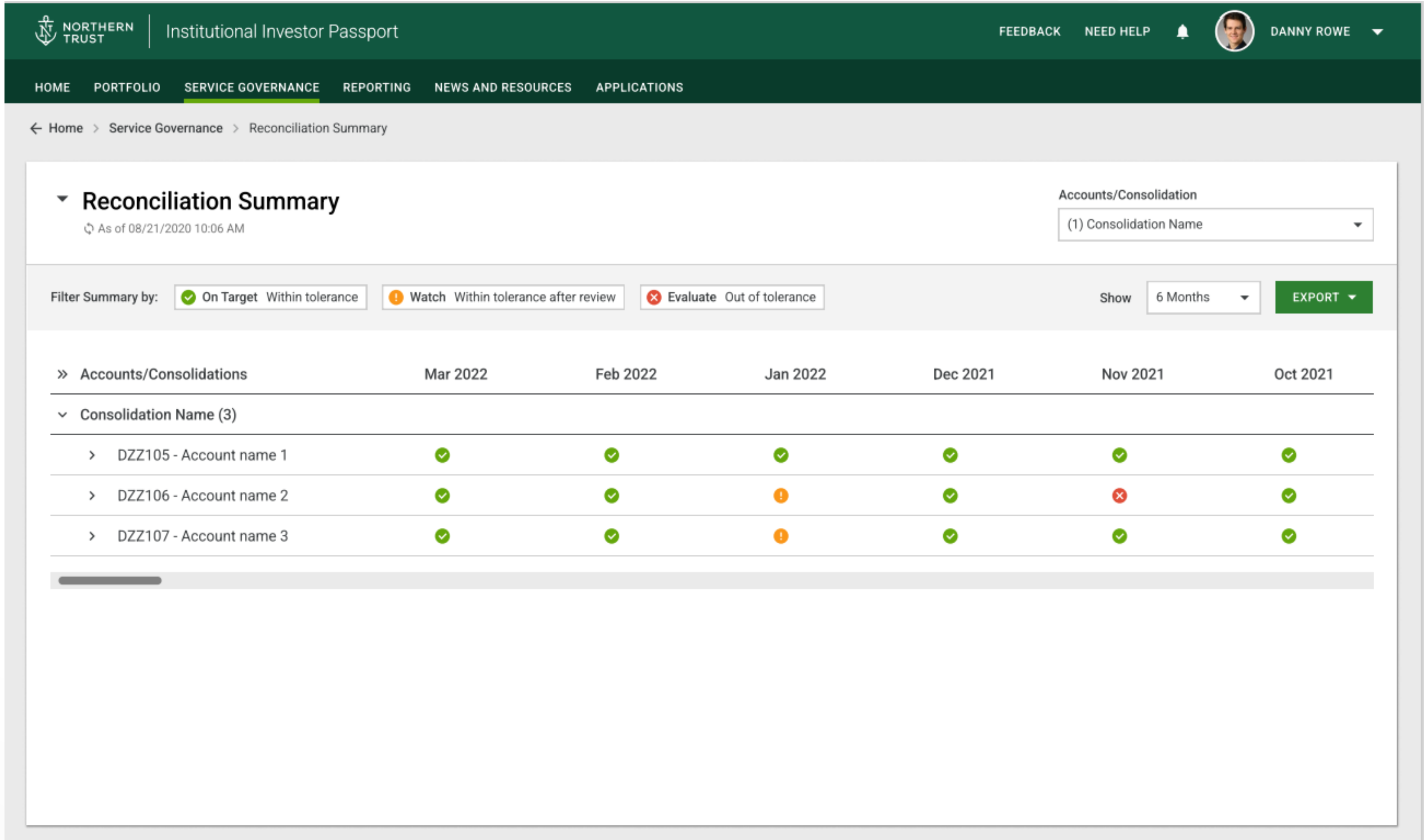
- Provides a stop light approach to easily surface areas of focus – evaluate, watch, and on target

Account View

- Offers category overview with intuitive drill-down into details
- Ability to view aggregate levels side by side for both Investment Managers and Northern Trust

Holdings Level View

- Detailed individual holding level reconciliation views highlight holdings, pricing, market value and accruals



[Product Video available]

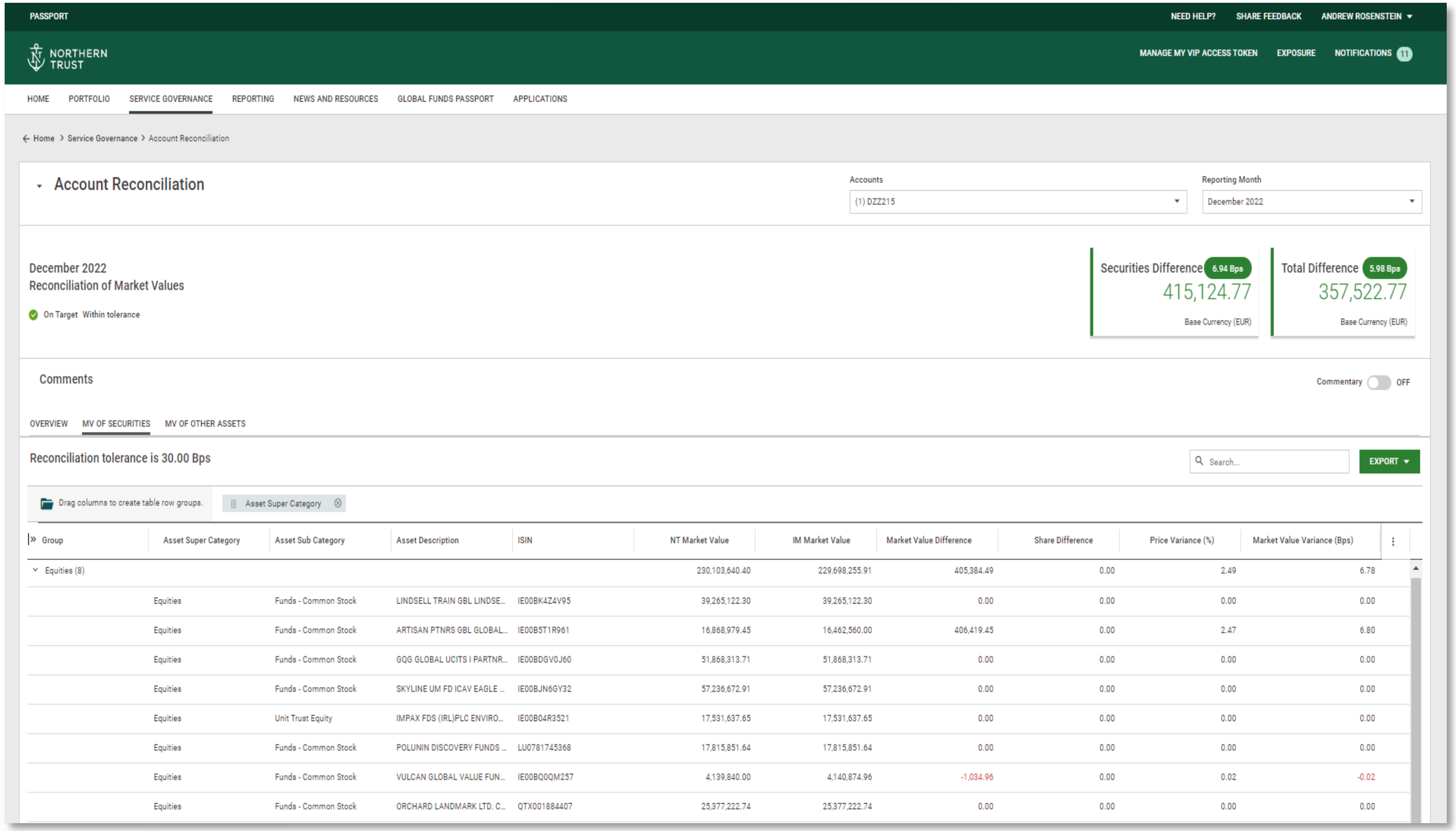
Available Now

Enhanced Manager Reconciliation Services – Detailed View

Provides transparency into the Enhanced Manager Reconciliation process

Key Features

- Detailed Account Reconciliation views highlight holdings, pricing, market value, and accruals discrepancies
- Offers category overview with intuitive drill-down into details
- Ability to view holdings for both Investment Managers and Northern Trust
- Measure differences against a defined tolerance
- Details are exportable to Excel



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