

Fulcrums, Levers, Pulleys and RAMP

The Northfield Analytics Framework and SAAS Platform
– Modern tools for Risk Analytics

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Why am I here?

- RAMP is Dan's vision of integrating all the various components involved in Portfolio Analytics into one SAAS platform to make:
 - A) Risk Analytics easier by handling data integration;
 - B) Make it more accessible by offering several deployment options;
 - C) Put Northfield in the position of doing work for clients on a consulting basis;
- The Infrastructure is now in place & we are looking for Beta clients.
 - CRD is using it in developing their new client facing Portfolio Analytics tool.

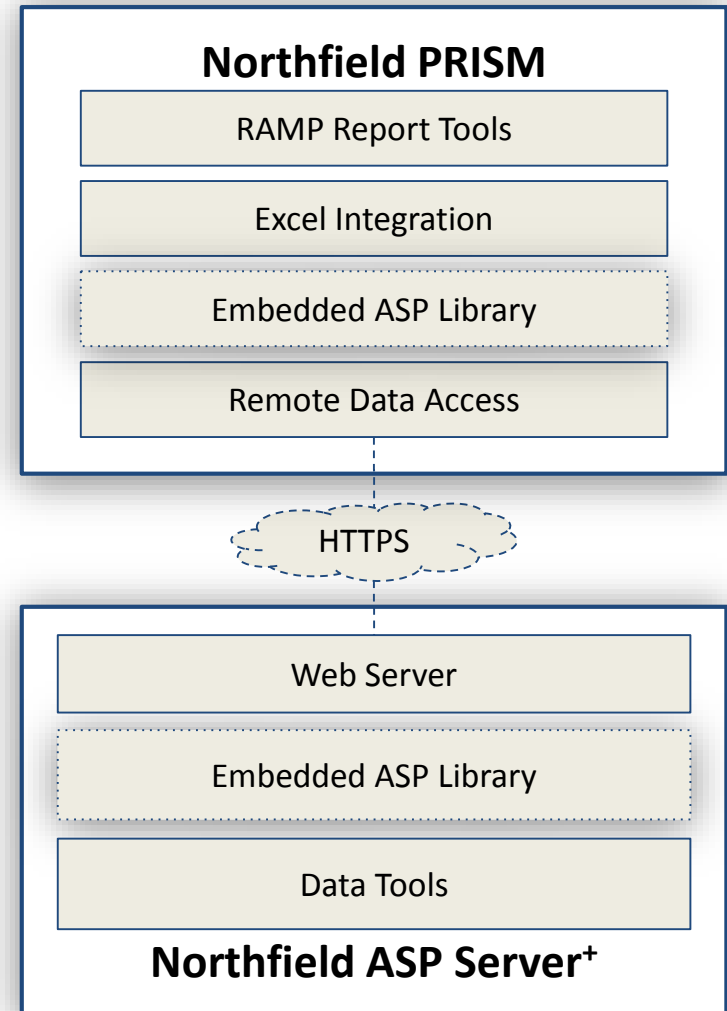
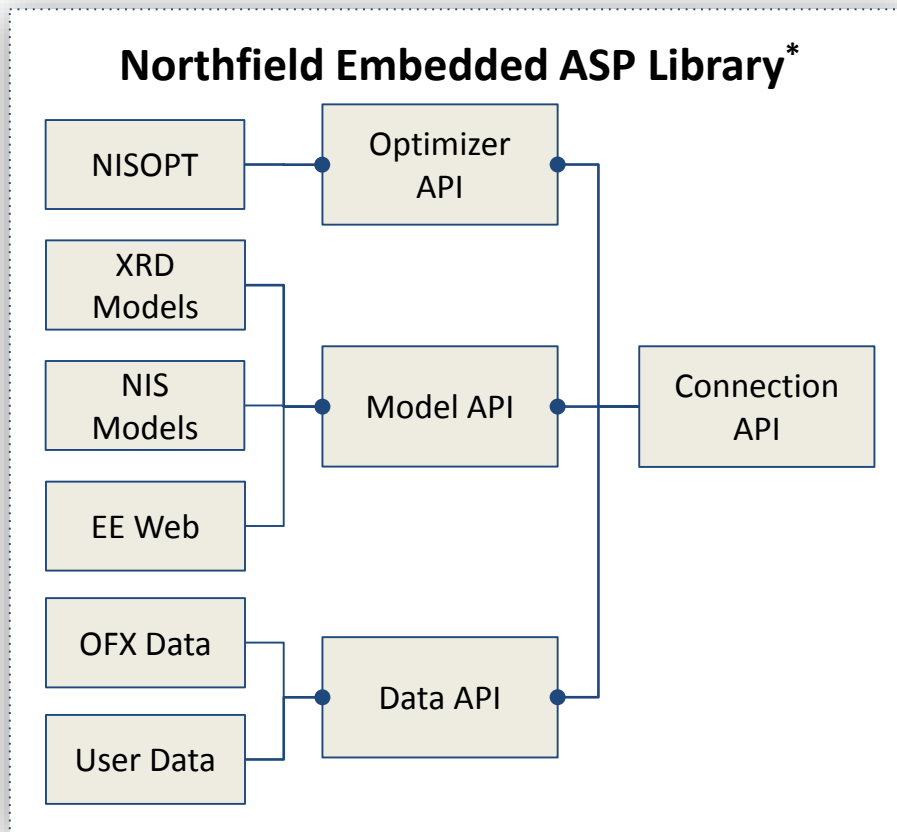
RAMP = Risk Assessment and Monitoring Protocol

- A new way to deliver portfolio analytics products, services and consulting covering a broad range of use cases.
 - Enterprise wide risk reporting for analysis and compliance
 - PDF reports developed to client specifications delivered on demand or on a schedule
 - Portfolio Optimization, Scenario Driven Stress Testing & Performance Attribution
 - Optimizer and PRISM analytics available to RAMP users via PRISM or API.
 - API available in JAVA, C#, Python & R
- Implemented via NISASP our Analytics Software Platform and SAAS web service -
 - Hosted or local technology solutions
 - Portfolio analytics consulting and services...

RAMP & NISASP architecture in a nutshell

- Secure integration with user portfolio holdings via Open Finance gateway
 - Direct access to custodial level data = no need to manually input user portfolio / benchmark data
 - **Client data is never stored on a Northfield server.** It's loaded into dynamically allocated data structures and deleted when it's no longer used.
- Multiple independent instances of the Optimizer are pooled and connected to a task scheduler that takes requests and assigns as much resource as is made available putting the rest in a queue.
 - This scales linearly ensuring a system that can grow as demand grows.
- Various levels of deployment. From:
 - A) None at all – custom reports delivered via email or secure FTP. Target users - Risk Management / Compliance
 - B) Hosted API – all instances of an optimizer are hosted on a Northfield server and accessed via API or PRISM. Target users – Quants who like to use Excel or code in Python or R
 - C) Full API – the entire system is deployed locally for very large clients with IT departments that require control or Northfield partners like CRD
- Multiple Architecture Support – Windows, Mac and Linux are supported

The Northfield Analytics Software Platform (ASP)



* Available for Java, R, Python on Windows, Linux & OSX

⁺ Available for on site installation, or cloud access via saas.northinfo.com

PDFs in RAMP - Portfolio Analytics 101

- Portfolio Analytics requires at least 2 datasets...
 - Portfolio Data
 - Asset ID
 - Asset Percentage weight in a portfolio (or benchmark)
 - Risk Model Data
 - Set of factor exposures for each asset
 - Factor covariance matrix
- These two datasets are joined to forecast Tracking Error and all the attendant decompositions. They are a necessary component of any Portfolio Analysis done in Northfield.
- And any time two datasets from different sources are joined... there are exceptions.
 - Either due to using different primary keys (asset ids) or
 - A lack of coverage of the asset in the risk model
- This can be a painful and frustrating process requiring time and expertise.

PDFs in RAMP – Exception resolution

- All Risk models:
 - ID cross reference
 - Is the asset ID type used for the portfolio the same as what's in the risk model table? How does one get the correct record with an alternate ID?
- EE model:
 - Dynamic asset coverage – what to do if an asset is not covered in the risk model.
 - Northfields Everything Everywhere model has a set of dynamic modelling procedures for various asset classes called EENIAC / EENIACWEB / NISASP Model Component
 - Different asset classes require different sets of input data
- RAMP clients have the option of using Northfield consulting staff to resolve and maintain records that are not in the risk model database.
 - Finding the right record for alternate IDs...
 - Creating and maintaining records for Equities, Bonds, Funds, OTC and other derivatives, Real Estate and anything else the client may have in the portfolio that isn't in the standard EE delivery.

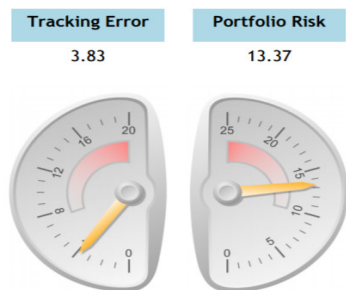
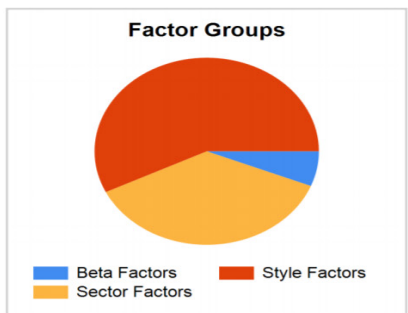
PDFs in RAMP – PRISM

- Every Report in the Optimizer and Prism has an underlying data structure that can be accessed via the PRISM report designer. RAMP clients will have 3 options here:
 1. Choose from a set of “stock” report formats for well known use cases – we will develop these with the input of our first Beta clients... do you want to be one of them?
 2. Get a Northfield consultant to note the requirements and come up with a suitable custom report
 3. Download PRISM and have a go themselves...
- Report design does not require any experience programming – just a familiarity with the underlying data and a willingness to get ones hands dirty... For example ...

PDFs in RAMP – Minimum Effort Version

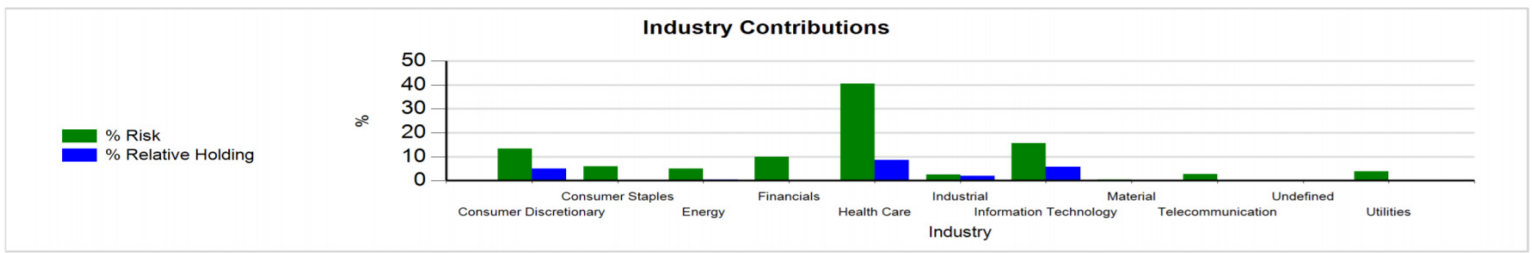
Benchmark S&P 500 31May2018
 Risk Model Fundamental 31May2018

Factor Name	Portfolio Exposure	% Contribution to Risk
Dividend Yield	-0.49	9.97
Drugs	0.08	8.69
Price Volatility	0.19	4.62
Book/Price	-0.29	2.51
Beta	0.06	2.50
Revenue/Price	-0.20	1.92
Trading Activity	0.17	1.38



Factor Name	Portfolio Exposure	% Contribution to Risk
Oil Extraction	0.01	-0.18
Insurance Life	-0.01	-0.20
Apparel & Textiles	0.01	-0.24
Major Banks	-0.06	-0.25
Medical Supplies	-0.02	-0.47
Earnings/Price	-0.27	-0.64

Stock Name	Stock ID	Percentage Holding	% Contribution to Risk	Beta to Benchmark
DEXCOM	25213110	2.13	8.77	0.67
VERTEX PHARMS.	92532F10	2.02	6.78	1.17
ALEXION PHARMS.	01535110	1.99	5.26	1.08
SHIRE SPN.ADR 1:3	82481R10	2.13	4.03	1.06
BIOGEN	09062X10	1.83	3.60	1.06



PDFs in RAMP – Prism & SQL Server Reporting Services (SSRS)

- What is SSRS?
- SSRS is the technology used to create the previous slide;
- It's a common industry standard
- Unlike the commonly known and hyper marketed name-brands in this field (Crystal Reports) it's free
- It's independent of PRISM and NISASP – it just requires the typed data schemas for each report
 - Any prism user can build a report with this tool without having to have access to internal Northfield code...
 - This means reports can be defined outside of PRISM (by anyone) and run (by anyone) while PRISM is running.
- Report creation and export is easily “batched” – there's no need for a user to manually run reports from a UI
- This can all be done either client or server side – the PDF output can be emailed or placed on a secure FTP for access...

PRISM and RAMP

- Prism is Northfield's Excel based product:
 - Risk Reporting
 - Optimization
 - Scenario Analysis and Stress Testing via NISBOOT
 - Performance Attribution
 - Factor Based Attribution
 - CATT – Complete Attribution – PA for Quants
 - And now, via the OFX gateway in RAMP - dynamic access to current and historic user portfolio data.
 - Northfield Consultants can resolve and maintain exceptions for the client if desired.
 - PDFs can be designed and generated and delivered using SSRS & PRISM report data structures – either by Northfield or directly by the user.

RAMP & Hosted API via NISASP (for quants)

- Hosted API – for the quants among us who want to integrate Northfield Optimizer and PRISM into their processes without deployment or resourcing hassle.
 - Access to an optimization connection via
 - JAVA
 - Python
 - C#
 - R
 - Access to RAMP Data reconciliation services
- Use case – get holdings from custodian via OFX, run a risk decomposition report – Python demonstration...