

Knowledge TierTM

to the power of

BARCLAYS POINT – A Case Study

Historical Index Implementation of 3 x HY Indexes (from Dec 29, 2006)

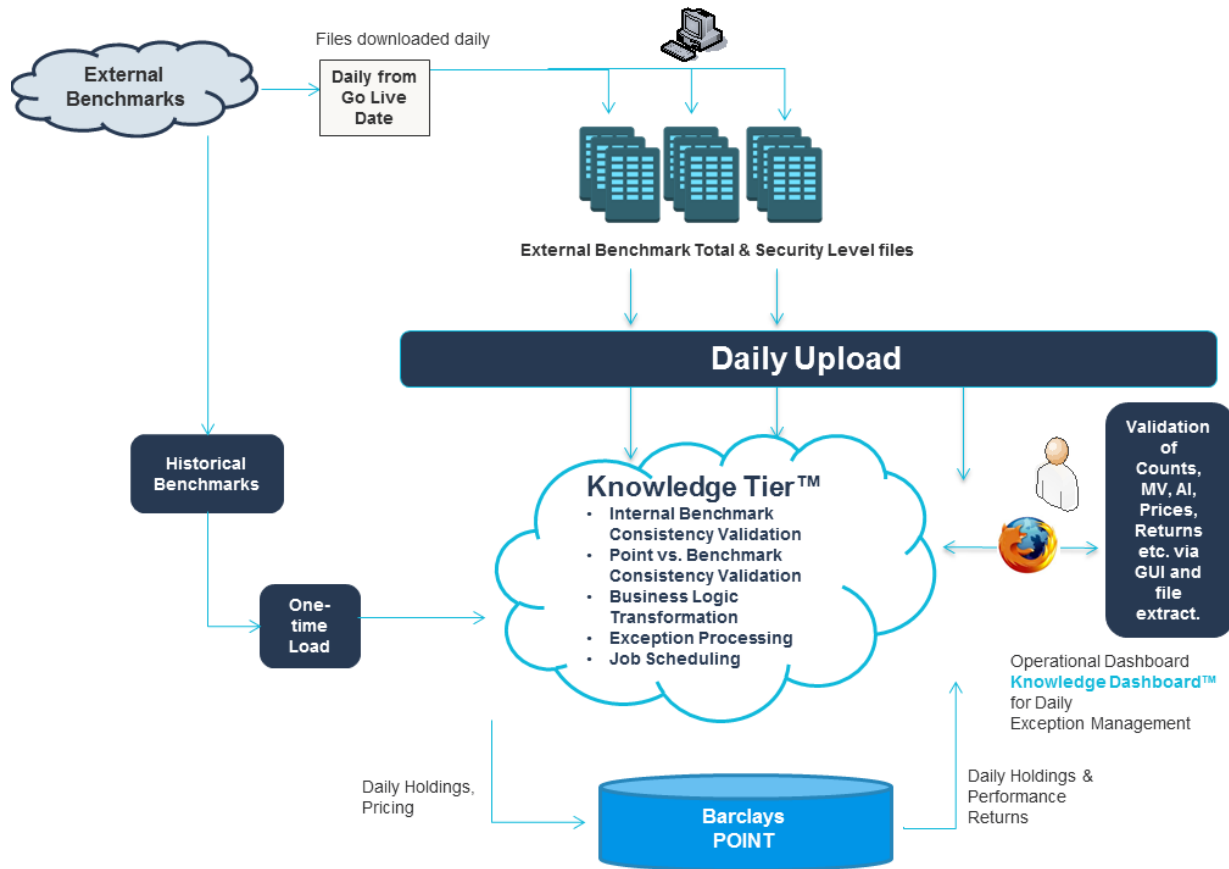
CHALLENGES

- Volume of data
- Indexes set up as portfolios in POINT
- Index re-balancing
- Differing accrued income and coupon treatment
- Defaults
- Index Provider versus POINT SMF differences
- 2008 & 2009 global financial crisis

METRICS

- Index Universe
 - US High Yield Index
 - US High Yield Constrained Index
 - US Cash Pay High Yield Constrained Index
- Required daily index holdings and prices updated on POINT via Knowledge TierTM
 - Daily Positions
 - Daily Prices >4 million prices
 - UDIs >1000 user defined instruments
 - 7.75 Years > 11.5 million positions
 - US High Yield Index/US High Yield Constrained Index = 1800 to 2300 securities
 - US Cash Pay High Yield Constrained Index= 1300 to 1800 securities

KNOWLEDGE TIER™ SOLUTIONS APPROACH



- Bulk updates to POINT through Knowledge Tier™ of
 - Historical positions
 - Prices
 - Sectors
- Historical validation of performance returns via Knowledge Tier™
- Return tolerance level checking for
 - Monthly
 - Yearly
 - Rolling since inception periods
- Out of tolerance periods dissected via Knowledge Tier™ tools
 - Investigation -> Outlier identification
 - Analysis -> Root cause
 - Testing -> Solution determination
- Utilize Knowledge Tier™ to effect adjustments (see Table Appendix)
- Develop ongoing index maintenance processes built on Knowledge Tier™ capabilities

‘MISSION IMPOSSIBLE’

without the POWER of KNOWLEDGE TIER™

BULK LOADS

- Bulk updates to POINT through Knowledge Tier™ of historical positions, prices and sectors
 - Automated File Transformation per required pre-defined formats
 - Automated File Delivery
 - Customizable Date Ranges to fit allowable parameters
 - Automated Delivery of Upload results back to Knowledge Tier™

VALIDATION / COMPARISONS & IDENTIFICATION OF DISCREPANCIES

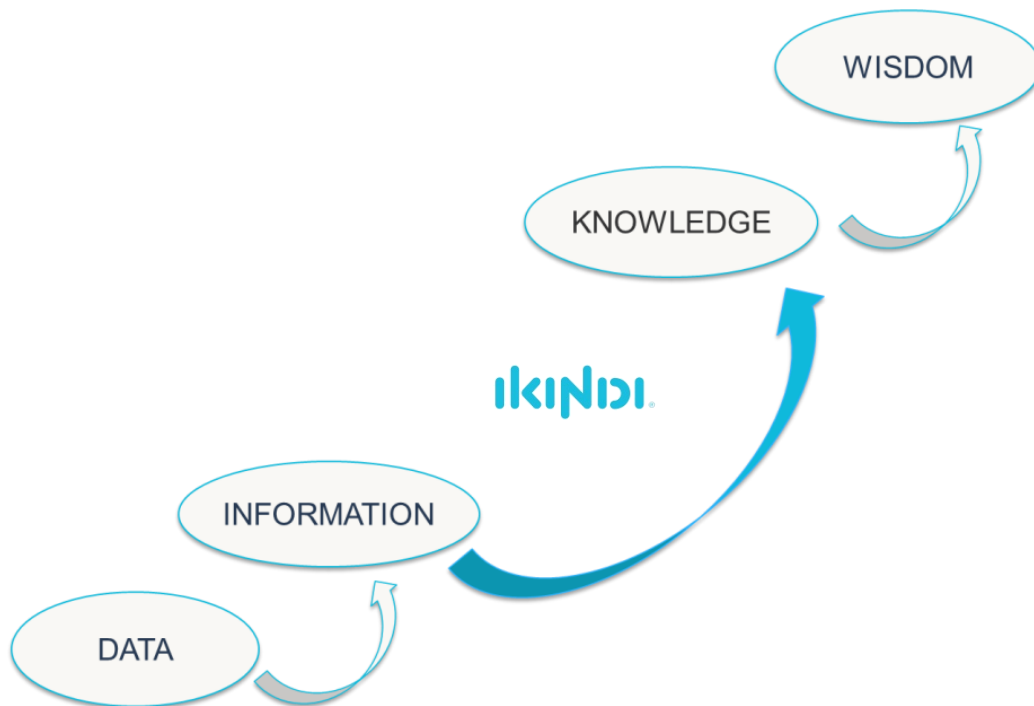
- Historical Performance Validation through Knowledge Tier’s Comparison Functionality
 - Total level performance check of periodic returns
 - Security level performance check on both
 - an absolute and
 - relative basis
 - Total level reconciliation of
 - Market Value
 - Accrued Income
 - Positions
 - Counts
 - Individual security comparisons of
 - Market Value
 - Accrued Income
 - Positions
 - Prices

MAKING ADJUSTMENTS within POINT to bring RESULTS in line with INDEX

- Exception Management and Implementation through Knowledge Tier’s features
 - On-demand upload of
 - Holdings
 - Pricing
 - Accrued Interest
 - Security
 - Override
 - Mapping
 - User Defined Instrument Implementation
 - Default Pricing
 - Capability to Define Upload Preferences and Rules

Client Results Achieved

- Historical benchmarking delivered in 2014 with index information dated from December 29th 2006.
- Implementation of an ongoing production process to ensure integrity of data through the use of Knowledge Tier’s value-added Performance functionalities and the Middle Office Command and Control power of Knowledge Dashboard™.
- Empowerment of the Front Office with Performance **Knowledge** they can trust.



Knowledge Tier™ Screenshots

Override Security Ids when generating holdings files

This page allows the user to define override Security Ids.

Select Label: **Holdings Security ID Override** Refresh

Override Security Id	Label	Parameter	Value	Start Date	End Date	Description
HdSecIdOverride	E2706633		BE6254004268	2015-02-02	2016-03-31	Using ISIN for Point
HdSecIdOverride	12505FAE		12505FAE	2015-02-02	2015-12-31	Using Point Cusp
HdSecIdOverride	882330AF		UDL_US882330AF7W	2012-09-28	2012-10-31	Point Fixes to match Benchmark
HdSecIdOverride	882330AG		UDL_US882330AG7W	2012-09-28	2012-10-31	Point Fixes to match Benchmark
HdSecIdOverride	882330AH		UDL_US882330AH7W	2012-09-28	2012-10-31	Point Fixes to match Benchmark
HdSecIdOverride	654090AJ		UDL_US654090AJAS	2012-09-28	2012-10-31	Point Fixes to match Benchmark

Point to Benchmark Comparison - Currency is USD

Using this page the user can compare values received directly from the respective index providers with the corresponding values found in the corresponding Barclays Point "index portfolio". The user can specify the threshold value for which the exception differences will be displayed.

Effective Date: **2015-03-13** To: **2015-03-13** Benchmark Code: **All** Daily Return Diff: Threshold: **0** Refresh

Date	Point	Point Ret Daily	Point Ret MTD	Point Ret YTD	Source	Src Ret Daily	Src Ret MTD	Src Ret YTD	Ret Diff Daily	Ret Diff MTD	Ret Diff YTD
2015-03-13	HY-Comp	-0.286553	-1.005141	2.061077		-0.287000	-1.011000	2.046000	0.0004	0.0059	0.0151
2015-03-13	HY-SubComp	-0.285639	-1.000954	2.142563		-0.286000	-1.004000	2.138000	0.0004	0.0030	0.0046
2015-03-13	HY-UnConComp	-0.287423	-1.009060	2.060405		-0.287000	-1.015000	2.046000	-0.0004	0.0059	0.0144

Point to Benchmark Comparison - Market Value & Accrued Interest

Using this page the user can compare values received directly from the respective index providers with the corresponding values found in the corresponding Barclays Point "index portfolio". The user can specify the threshold value for which the exception differences will be displayed.

Effective Date: **2015-03-13** To: **2015-03-13** Benchmark Code: **All** Base Market Value Breaks: Threshold: **0** Refresh

Date	Point	Point MV+AI Base	Point MV+AI Loc	Point Position	Point Count	Source	Src MV+AI Base	Src MV+AI Loc	Src Position	Src Count	MV+AI Diff Base	MV+AI Diff Loc	Pos Diff	MV Loc: % Diff	MV Base % Diff	Pos % Diff
2015-03-13	HY-Comp	1,372,762,913.10	1,372,762,913.10	1,346,320,694.00	2327		1,372,641,052.63	1,372,641,052.63	1,346,320,694.00	2326	121,860.47	121,860.47	0.00	0.008878	0.008878	0.000000
2015-03-13	HY-SubComp	1,173,524,407.10	1,173,524,407.10	1,130,993,400.00	1879		1,173,497,111.15	1,173,497,111.15	1,130,993,400.00	1878	27,295.96	27,295.96	0.00	0.002326	0.002326	0.000000
2015-03-13	HY-UnConComp	1,372,706,986.50	1,372,706,986.50	1,346,172,497.00	2327		1,372,585,515.33	1,372,585,515.33	1,346,172,497.00	2326	121,471.17	121,471.17	0.00	0.008850	0.008850	0.000000

Internal Consistency Validation

This page allows the user to validate the consistency of the data received from the respective index provider by comparing actual values in the index files to derived values on a security level. At the top of each grid the user can specify the threshold value for which the exception differences will be displayed.

Effective Date: **2015-03-13** To: **2015-03-13** BB-B Cash Pay High Yield Constrained Index - CUSIP/ISIN: **All** Total MV+AI: Threshold

Index	Date	ISIN/CUSIP	Current Face	Price	Quote Method	Accrued Loc	MV & AI Loc	Currency	M&I Weight	Prin Val	Accrued	Tot MV & AI	Tot MV+AI Diff	FX Rate 1	FX Rate 2
	2015-03-13	US000361A086	327,300.00	109.000000		1.19	360,645.96	USD	0.0307	356,757.00	3,888.96	360,645.96	0.00	0.000000	0.0000
	2015-03-13	US000777AA25	136,500.00	118.056000		2.56	164,643.30	USD	0.0140	161,146.44	3,496.86	164,643.30	0.00	0.000000	0.0000
	2015-03-13	US000777AB08	151,100.00	110.000000		2.95	170,665.88	USD	0.0145	166,210.00	4,455.88	170,665.88	0.00	0.000000	0.0000
	2015-03-13	US000809AB14	502,900.00	105.097000		1.29	535,028.61	USD	0.0456	528,532.81	6,495.79	535,028.61	0.00	0.000000	0.0000

Effective Date: **2015-03-13** To: **2015-03-13** HY-Comp Source: **ISIN** ALL MTD Return Diff % Threshold: **0.5** Refresh

Date	Point	Source	CUSIP	ISIN	Point Ret Daily	Point Ret MTD	Src Ret MTD	Src Ret YTD	Ret Diff Daily	Ret Diff MTD	Ret Diff YTD	Point Contrib MTD	Src Contrib MTD	Contrib Diff MTD	Point Curr	Src Curr
2015-03-13	HY-Comp		00103YAF	US00103YAF88	1.28		1.216000		0.0707		0.00016684	0.00015759	0.00000925	USD	USD	
2015-03-13	HY-Comp		00214TAA	US00214TAA60	0.16		0.115000		0.0547		0.00011085	0.00007512	0.00003573	USD	USD	
2015-03-13	HY-Comp		008294AE	US008294AE02	-3.90		-5.455000		1.5532		-0.00037978	-0.000046913	0.00008935	USD	USD	
2015-03-13	HY-Comp		016275AN	US016275AN98	-8.22		-5.579000		-2.6475		-0.00100924	-0.00068064	-0.00032860	USD	USD	

APPENDIX TABLE

Use of Knowledge Tier™ to effect adjustments

ACTUAL SCENARIOS	FIXES APPLIED
AI Diffs (due to default timings)	
Point no AI whole month	UDI no default whole period
no AI whole month	UDI default whole period
Intra month diffs	UDI in default or not in default part of the period
Coupon added to AI	0 coupon UDI with AI override and instrument event to offset AI drop following month
Coupon Diffs	
Coupon paid on not on PT	UDI not in default
Coupon paid on PT not both had AI up to coupon pay date	UDI with default on coupon record date
Coupon paid on but subsequently cancelled and no AI on PT	UDI in default coupon record date
Coupon paid on & PT but for different amount	UDI and post instrument event to make adjustment
Coupon paid on PT not but no AI on PT	UDI and price adjustment to offset interest gain
Negative Cash Flows on	UDI and post negative income instrument event
Call Timing Diffs	UDI with attributes
Non-UDI Adjustments	
ERRONEOUS INTEREST ON DROPS	Price adjustment to offset interest gain
AI DIFFS (due to weekends)	AI override on entire portfolio for last day of the month on PT to include extra days AI
Positions Missing	Positions Upload
ADDS port missing	Addition of Adds portfolio
Drops processing	Drops processed
Missing Prices	Price Upload