Banking Data Warehouse Support for the Basel II and Basel III Framework

Including Support for the Capital Adequacy Framework and Federal Financial Institutions Examination Council

BDW Release – 8.4

White Paper

Contents

About this White Paper

This paper outlines the components of the IBM Banking Data Warehouse (BDW) and how these components assist financial institutions in addressing the data modeling and data consolidation issues relating to the Basel II and Basel III (Basel II/III) Framework.

This paper is divided into the following chapters:

- Introduction summarizes the Basel II/III Framework requirements.
- Chapter 1 introduces and summarizes the benefits of BDW as a central data repository for the financial institution.
- Chapter 2 outlines each of the BDW components.
- Chapter 3 describes briefly an overall functional architecture for Basel II/III Framework and how each of the BDW components fit into this architecture.
- Chapter 4 discusses various Industry Directives and how BDW can address their requirements.
- Chapter 5 discusses the refinement of capital requirement for market risk and the United States specific Federal Financial Institutions Examination Council (FFIEC) 101/102 Basel II Pillar 3 disclosures requirements and how BDW can address these requirements.
- Chapter 6 discusses the new global liquidity risk framework, the new capital requirements, and the changes to Counter-party Credit Risk (CCR), termed as “Basel III” and how they are supported in BDW.

Who Should Read this White Paper?

- Risk managers and internal audit managers
- Credit risk and ratings specialists
- Finance directors, board of directors and risk committees
- IT, operations managers and compliance officers
- Financial markets and banking consultants
- Members of accountancy practices

Introduction

Supports objectives to achieve conformity of measures and dimensions across the financial institution.

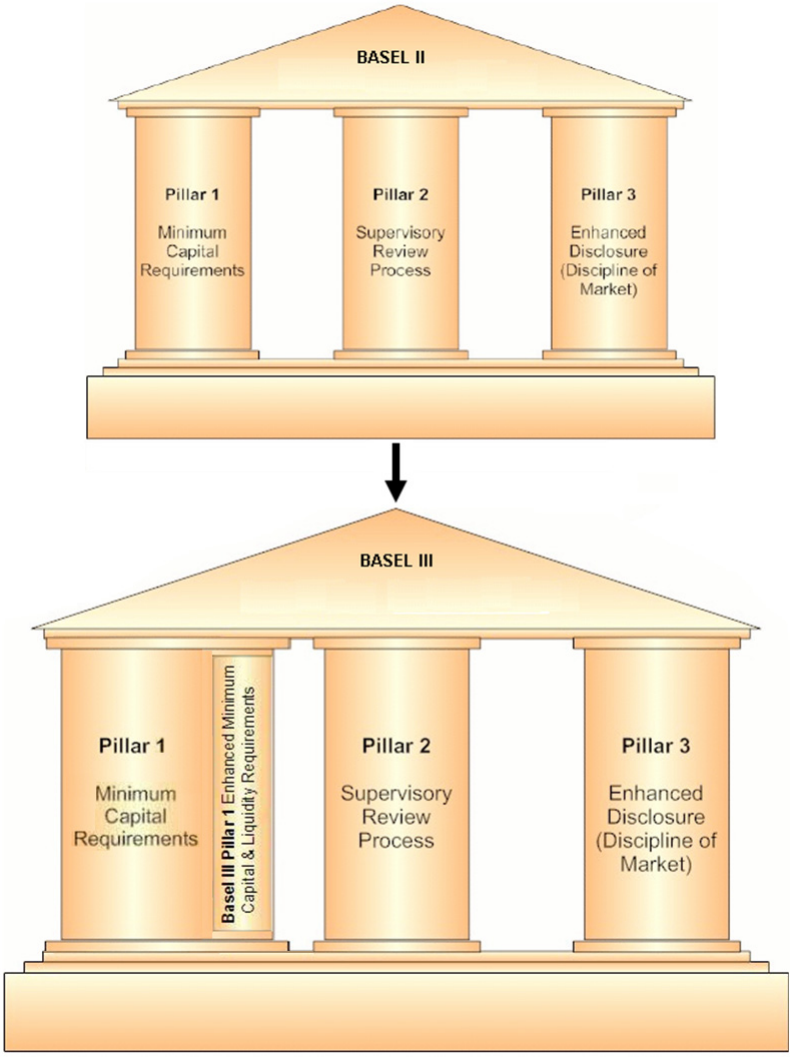
The Bank for International Settlements (BIS) introduced the new capital accord in 2001. Also known as the Basel II Capital Accord, the New Basel Capital Accord is applied on a consolidated basis to internationally active banks to address the risk management practices for active financial institutions in the international arena. The Basel II Accord was the result of substantial losses in the international markets since 1992, which were attributed to poor risk management practices. The Basel II Accord makes it mandatory for financial institutions to use standardized measurements of credit, market risk and operational risk. However, different levels of compliance allow financial institutions to pursue advanced risk management approaches to free up capital for investment.

BSTs have been updated to provide structures to address the latest Basel II Framework reporting requirements.

Basel III is an extension of the existing Basel II Framework, and introduces new capital and liquidity standards to strengthen the regulation, supervision and risk management of the banking sector. The global capital framework and new capital buffers will require financial institutions to hold more capital and higher quality of capital than under current Basel II rules. The new leverage ratio introduces a non-risk-based measure to supplement the risk-based minimum capital requirements. The new liquidity ratios ensure that adequate funding is maintained in case of severe crisis.

During the analysis of the Reporting requirements, the BSTs can be used to accelerate discussions with business users to provide rapidly prototypes of specific sample reports.

The figure below shows how Basel III strengthens the three Basel II pillars, especially Pillar 1 with enhanced minimum capital and liquidity requirements.



Basel III Summary

- **Capital Framework**
  - *Higher Minimum Tier 1 Capital Requirements*

    Tier 1 Capital Ratio increases from 4% to 6%. The ratio will be set at:

    4.5% from 1 January 2013

    5.5% from 1 January 2014

    6% from 1 January 2015.
  - *Capital Conservation Buffer*

    Designed to absorb losses during periods of financial and economic stress. Financial institutions will be required to hold a capital conservation buffer of 2.5% to withstand future periods of stress, bringing the total common equity requirement to 7% (4.5% common equity requirement and the 2.5% capital conservation buffer).The capital conservation buffer must be met exclusively with common equity. Financial institutions that do not maintain the capital conservation buffer will face restrictions on payouts of dividends, share buybacks and bonuses.
  - *Counter-cyclical Capital Buffer*

    A counter-cyclical buffer within a range of 0% and 2.5% of common equity or other fully loss absorbing capital will be implemented according to

national circumstances. This buffer will serve as an extension to the capital conservation buffer.

- *Higher CET1 – Common Equity Tier 1*
  Increase from 2% to 4.5%. The ratio will be set at:
  3.5% from 1 January 2013
  4% from 1 January 2014
  4.5% from 1 January 2015
- *Minimum Total Capital Ratio*
  Remains at 8%. The addition of the capital conservation buffer increases the total amount of capital a financial institution must hold to 10.5% of risk-weighted assets, of which 8.5% must be tier 1 capital. Tier 2 capital instruments will be harmonized and tier 3 capital will be abolished.

- **Liquidity Framework**
  - *Liquidity Coverage Ratio (LCR)*
    To ensure that sufficient levels of high-quality liquid assets are available for one-month survival in case of a severe stress scenario.
  - *Net Stable Funding Ratio (NSFR)*
    To promote resilience over long-term time horizons by creating additional incentives for financial institutions to fund their activities with more stable sources of funding on an ongoing structural basis.
- **Changes to Counterparty Credit Risk** (CCR)
  - *CVA Risk Capital Charge*
    Basel III introduces capital requirements to cover Credit Value Adjustment (CVA) risk and higher capital requirements for securitization products.

1. Data Integration and the Banking Data Warehouse

Risk weighted asset and economic capital calculations should eventually become a key driving force for decisions within financial institutions.

With its flexibility to enable the creation of a range of data warehouse solutions from departmental data marts to an enterprise-wide data warehouse, BDW enables financial institutions to build data warehouse solutions to suit their specific needs. BDW comprises a proven, flexible and scalable data warehouse technical infrastructure to address the following business reporting and analysis needs:

- Profitability
- Relationship Marketing
- Regulatory Compliance
- Risk Management
- Asset and Liability Management
- Investment Management
- Wealth Management

Financial institutions are facing risk and compliance-related challenges. In response to these challenges, regulatory initiatives have sought to mitigate these risks. These initiatives include Basel II/III, International Financial Reporting Standards (IFRS)/IAS, Mortgage Industry Standards Maintenance Organization (MISMO) and the Sarbanes-Oxley Act (SOX).

In an increasing competitive environment, financial institutions need a single view of their business information.

The pace of change driven by the compliance challenges will be different across financial institutions. However, there is now a general recognition that the long-term direction of aligning economic and regulatory capital means that risk-weighted assets and economic capital calculations should eventually become a key driving force for decisions within the financial institution.

The Banking Data Warehouse is an enterprise-wide data architecture for a consolidated view of business data.

The long-term business of a financial institution is dependent on maximizing return on capital (ROC) and risk-adjusted return on capital (RAROC). Risk-weighted asset and capital calculations may be utilized to provide bespoke pricing. This allows the financial institution to determine which products should be promoted to which customers to achieve maximum return on investment (ROI) and so becomes the driver for marketing and relationship management.

Data structures that drive risk and financial data need to be aligned to risk-based data, such as:

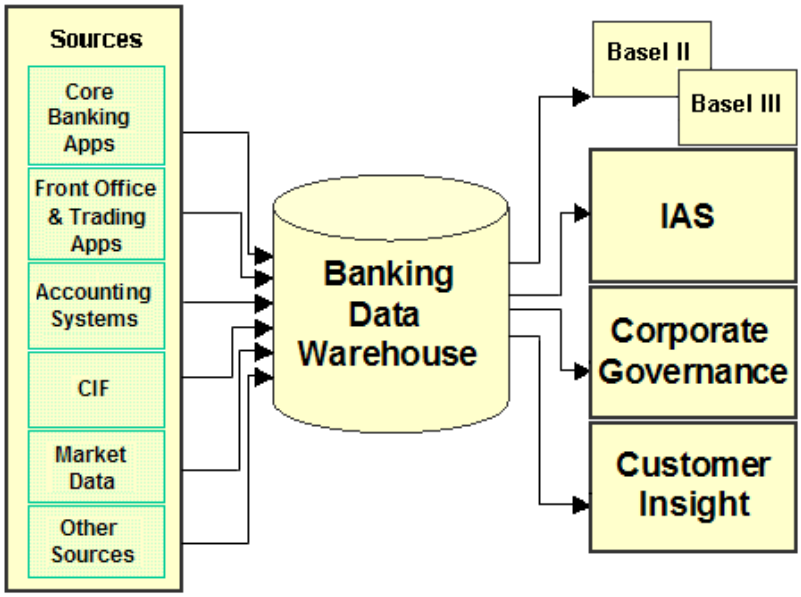
- Transactional data that covers all types of transaction, and links the financial results of each transaction with the risk and financial objectives of the financial institution.
- Asset data that covers all types of assets linked to the transaction. The valuation of these assets and the correlation of asset behavior.
- Customer data for all counter parties including credit risk measurement of the counter party, making provisions when new information or circumstances change that risk. Detailed data on customer is required to support product selection and pricing in addition to other relationship management decisions.

There are different ways to view this data and not all are well represented by either risk or financial systems. Executive management and regulators need coherent views. This approach requires an integrated data environment supporting the decision-making and reporting requirements across the entire financial institution.

Given the connection between risk, finance and customer insight, financial institutions require an integrated data environment supporting the decision-making and reporting requirements across all aspects of the business and compliance requirements.

With BDW as the underlying architecture, financial institutions can now leverage all the advantages of an integrated data hub.

BDW provides the framework for such an enterprise data integration environment. BDW has comprehensive support for the Basel II/III Framework, IFRS/IAS and General Ledger information in addition to all other areas of banking. Many financial institutions are now using BDW to support the integrated data requirements across all aspects of their business as represented below.



The figure above shows the consolidation of data from a financial institution's multiple source systems in the central BDW data hub.

The benefits of using BDW as the financial institution's data integration hub with a single consolidated view of data include:

- Integrated risk and compliance information
- Increased flexibility to address new requirements
- Faster response to new requirements
- Improved ability to leverage data across lines of business
- Increased cross-sell opportunities
- Increased Know Your Customer (KYC) ability in customer insight and credit, market, liquidity and operational risk

BDW provides a well-architected set of data structures for both data consolidation and data reporting.

- Increased consistency in data usage
- IT cost savings due to reuse of population, storage and reporting components

BDW supports the data requirements of Basel II and has been implemented for this purpose by many financial institutions. BDW provides comprehensive data coverage for retail and wholesale banking. It may be integrated with other Basel II/III risk applications or engines to provide an end-to-end risk management framework for the financial institution.

For further information on BDW, see *IBM Banking Data Warehouse General Information Manual*. For further information on IFRS/IAS support, see White Paper *Banking Data Warehouse Support for International Financial Reporting Standards (IFRS)*. These documents can be requested by emailing 3ifwhelp@ie.ibm.com.

Any data and business requirements of the financial institution can be customized into the BDW.

Non-Basel II/III Financial Institutions

The risk structures defined in BDW are not just of interest to financial institutions which are either internationally active financial institutions or identified by the regulators required to implement Basel II/III, but are applicable to any organization that wants to improve the capability of their risk management systems. Financial institutions using BDW are building on a best-of-breed foundation that addresses risk and compliance requirements using IBM's market-leading research and technology, based on open architecture principles.

Risk data and disclosure requirements as defined in the Basel II documentation are covered by BDW.

2. Banking Data Warehouse Components

BDW is a proven, stable foundation for a Basel II data warehouse.

The BDW content models are the cornerstone components for a financial institution's development of a data warehouse and BI environment. This BDW environment may be integrated with the financial institution's existing data mart or business information warehouse reporting environments. The following sections detail the main BDW components.

Banking Data Warehouse Model

The full range of typical business issues are already encapsulated within BDW.

As a BI infrastructure supporting multiple lines of business and analytical functions within the financial institution, BDW is an entity relationship data model that provides the atomic data needed for a data warehouse. The aim of this shared infrastructure is to provide a data integration hub that will reduce the development and operational costs in providing BI functionality to the myriad of front and back-office organization units. This is made possible by sourcing data once into a data-integration hub, and then reusing BI development and operational skills and assets. The organization can then focus on managing the transformation and distribution of consistent data used for BI across the lines of business.

Data from all across the financial institution can be consolidated into BDW.

IBM provides a default physical database design, generated from the logical entity relationship data model. Details on how to generate the physical model from the logical model and modify the physical database for optimal database performance can be found in white paper *Banking Data Warehouse support for Physical Model Design and Database Performance Considerations*. This physical data model incorporates IBM's vast experience in implementing data warehouse databases for the financial services sector and can be implemented "as is" to show how a data warehouse should work. It is more likely though, that the physical data model will be customized further by a data warehouse team of experts comprised of senior warehouse architects and database administrators to ensure optimal configuration for the financial institution's data distribution and performance characteristics.

BDW contains the data structures needed by a financial institution to support the approaches for credit risk, operational risk as well as the data structures needed to support market risk as defined in the Basel II/III Framework.

Business Solution Templates

BDW contains Business Solution Templates (BSTs), reflecting the most common types of query and analysis for specific business areas that most users need to perform. BDW also supports other data requirements such as reporting, data mining and decision support.

BSTs are reusable sample dimensions and measures specifically designed for financial institutions.

BSTs have three main components:

- Reusable financial measures
- Reusable financial dimensions and members
- Groupings of the above measures and dimensions into configurable BSTs

Measures include, for example, key performance indicators (KPIs) for a financial institution, such as Number of Customers, Total Amount of Funds under Management and Number of Transactions. Each measure is fully defined and may be used either in its own right or as a component contributing to a formula, which itself can contribute to a larger formula. Where the measure is used in a formula, it is provided with a context-sensitive calculation contribution. For example, in one formula, the measure may be summed into the total, whereas in another it may need to be subtracted from the total. This reuse of measures ensures conformity of business measure use across the organization and is a key aid in the metadata management activities of a BI environment within an organization.

Measures only become useful when they are compared against each other under different headings. For example, Total Deposits compared over the last twelve monthly periods, Number of Customers within each of several geographical regions. The BST dimensions provide the headings under which measures may be broken down and compared. Over 4,600 industry standard dimensions and members are supplied and fully defined. Dimensions are reused in multiple BSTs, thereby enforcing conformity of dimensions used in different analysis areas. This enables uniformity of reporting and the ability to cross-reference measures from different areas of analysis, such as comparing profitability to risk measures across the same geographic and time-related breakdowns.

BSTs are pregroupings of measures and dimensions that capture an analytical need in a given business area, such as Security Analysis, Involved Party Exposure, Customer Profitability or Credit Risk Assessment. The supplied set of templates may be fully customized, and new templates can be created in order to reflect exactly the needs of a particular financial institution. New measures

and dimensions may also be added to the model and incorporated into the templates.

The complete set of BSTs provided in BDW is as follows:

Risk Management

- Advanced IRB And AMA Analysis
- Advanced Risk Based Capital Analysis
- Asset Pool Performance Analysis
- Authority Profiling
- Available Unencumbered Asset
- Collections Analysis
- Concentration Of Funding
- Contractual Maturity Mismatch
- Credit Risk Analysis
- Credit Risk Assessment
- Credit Risk Exposure Analysis
- Credit Risk Mitigation Assessment
- Cross Currency Liquidity Risk
- Customer Credit Risk Profile
- Debt Restructure Analysis
- Economic Capital Analysis
- Equity Exposure Analysis
- Foreign Currency LCR Analysis
- Funding Diversification Risk
- Incremental Risk In The Trading Book
- Individual Credit Assessment Analysis
- Insurance Risk Profile
- Integrated Risk Analysis
- Interest Rate Risk Analysis
- Intra-Day Liquidity Risk
- Involved Party Exposure
- 14 Liquidity Gap Analysis
- Liquidity Position Analysis
- Liquidity Retail Funding Risk
- Liquidity Risk Analysis
- Liquidity Wholesale Funding Risk
- Location Exposure
- Long Term Liquidity Analysis
- Market Risk Capital Charges Analysis
- Market Risk VaR Analysis
- Marketable Assets Risk
- Non Performing Loan Analysis
- Off-Balance Sheet Liquidity Risk
- Operational Risk Assessment
- Operational Risk Loss Analysis
- Outstandings Analysis
- Payment Card Fraud Analysis
- Portfolio Credit Exposure
- Product Risk Analysis
- Securitization Analysis
- Securitization Detail Analysis
- Security Analysis
- Short Term Liquidity Analysis
- Value At Risk Analysis

Regulatory Compliance

- Best Execution Analysis
- Continuous Auction Analysis
- ECB Reporting
- Financial Capital Adequacy Analysis
- Foreign Financial Account Analysis
- Periodic Auction Analysis
- Quarterly Transaction Reporting Analysis
- Quote Driven Analysis
- Sarbanes Oxley Act Analysis (SOX)
- Sarbanes Oxley Act Balance Sheet Analysis
- Sarbanes Oxley Act Cash Flow Analysis
- Sarbanes Oxley Act Statement Of Income Analysis
- Sarbanes Oxley Act Stmt Chg Shrhldr Eqty Anlys
- Structure of Regulatory Capital
- Suspicious Activity Analysis
- Transaction Activity Analysis
- Transaction Reporting Analysis

Relationship Marketing

- Call Centre Performance Analysis
- Campaign Analysis
- Card Fees Analysis
- Card Loyalty Analysis
- Cross Sell Analysis
- Customer Attrition Analysis
- Customer Behavior
- Customer Complaints Analysis
- Customer Delinquency Analysis
- Customer Experience Analysis
- Customer Interaction Analysis
- Customer Investment Profile
- Customer Loyalty
- Individual Customer Profile
- Lead Analysis
- Market Analysis
- Mobile Visitor Analysis
- Operator Script Performance Analysis
- Payment Card Merchant Analysis
- Wallet Share Analysis
- Website Page Analysis
- Website Visitor Analysis

Profitability

- Activity Based Costing Analysis
- Business Procedure Performance Measurement
- Channel Profitability
- Customer Lifetime Value Analysis
- Customer Profitability
- Income Analysis
- Insurance Product Analysis
- Investment Arrangement Analysis
- Islamic Banking Profitability Analysis
- Location Profitability
- Organization Unit Profitability
- Performance Measurement
- Product Analysis
- Product Profitability
- Profitability Analysis
- Transaction Profitability Analysis

Asset & Liability Management

- Capital Allocation Analysis
- Capital Procurement
- Credit Loss Allowance Analysis
- Economic Balance Sheet Analysis
- Equity Position Exposure
- Financial Management Accounting
- Financial Market Transaction Analysis
- Funds Maturity Analysis
- High Value Outward Payment
- Interest Rate Sensitivity Analysis
- Inward Payment Rate Tolerance
- Inward Payment User Activity
- Inward Payments Volume
- Inward Payments
- Liquidity Analysis
- Net Interest Margin Variance
- Outward Payments
- Positions Analysis
- Short Term Funding Management
- Structured Finance Analysis
- VWAP Analysis

Investment Management

- Class Action Period Holding Analysis
- Corporate Action Analysis
- Dynamic Performance Analysis
- Financial Market Lot Analysis
- Foreign Exchange Analysis
- Holding Movement Analysis
- Investment Fund Analysis
- Performance Analysis
- Performance Versus Benchmark Analysis
- Proxy Vote Analysis
- Securities Available For Lending
- Settlement Analysis

Wealth Management

- Asset Allocation Analysis
- Client Profitability Analysis
- Client Summary Analysis
- Portfolio Fee And Tax Analysis
- Portfolio Gains Analysis
- Portfolio Performance Analysis
- Portfolio Risk Analysis
- Profit & Loss Attribution Analysis

BSTs provide the underlying reporting structures for Basel II Pillar 3 Market Discipline Quantitative Disclosures as defined in the Basel II/III Framework documentation published by BCBS.

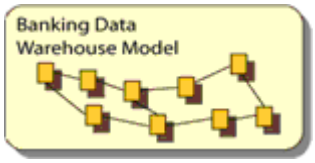
The table below shows the coverage across the three Basel II/III pillars provided by the relevant BDW BSTs.

Legend

Pillar 1		Pillar 2		Pillar 3	
C1	Credit Risk	B2	Board and Management Oversight	C3	Capital
M1	Market Risk	C2	Sound Capital Assessment	R3	Risk Exposure and Assessment
O1	Operational Risk	R2	Risk Assessment		
		M2	Monitoring and Reporting		

Risk management Category		Solution Name	Pillar 1			Pillar 2					Pillar 3	
			C1	M1	O1	B2	C2	R2	M2	I2	C3	R3
Credit Risk	Risk	Security Analysis	✓	·	·	✓	·	✓	✓	✓	·	✓
	Risk	Collections Analysis	✓	·	·	✓	·	✓	✓	✓	·	✓
	Risk	Non Performing Loan Analysis	✓	·	·	✓	·	✓	✓	✓	·	✓
	Risk	Outstandings Analysis	✓	·	·	✓	·	✓	✓	✓	·	✓
	Risk	Location Exposure	✓	·	✓	✓	·	✓	✓	✓	·	✓
	Risk	Credit Risk Analysis	✓	·	·	✓	·	✓	✓	✓	·	✓
	Risk	Credit Risk Assessment	✓	·	·	✓	·	✓	✓	✓	·	✓
	Risk	Credit Risk Mitigation Assessment	✓	·	·	✓	·	✓	✓	✓	·	✓
	Risk	Credit Risk Exposure Analysis	·	·	·	·	·	·	·	·	·	·
	Risk	Involved Party Exposure	✓	·	✓	✓	·	✓	✓	✓	·	✓
	A&L	Credit Loss Allowance Analysis	✓	·	·	✓	·	✓	✓	✓	·	✓
	A&L	Structured Finance Analysis	✓	·	·	✓	·	✓	✓	✓	·	✓
	Risk	Portfolio Credit Exposure	✓	·	·	✓	·	✓	✓	✓	·	✓
	Risk	Insurance Risk Profile	✓	·	✓	✓	·	✓	✓	✓	·	✓
	Risk	Customer Credit Risk Profile	✓	·	·	✓	·	✓	✓	✓	·	✓
	Risk	Securitization Detail Analysis	·	·	·	·	·	·	·	·	·	·
	Risk	Advanced IRB And AMA Analysis	·	·	·	·	·	·	·	·	·	·
	Risk	Advanced Risk Based Capital Analysis	·	·	·	·	·	·	·	·	·	·
	Risk	Securitization Analysis	✓	·	·	✓	·	✓	✓	✓	·	✓
	Risk	Economic Capital Analysis	·	·	·	·	·	·	·	·	·	·
Interest Rate Risk	Risk	Interest Rate Risk Analysis	·	✓	·	✓	·	✓	✓	✓	·	✓
	A&L	Interest Rate Sensitivity Analysis	·	✓	·	✓	·	✓	✓	✓	·	✓
	A&L	Net Interest Margin Variance	·	✓	·	✓	·	✓	✓	✓	·	✓
Operational Risk	Risk	Operational Risk Assessment	·	·	✓	✓	·	✓	✓	✓	·	·
	Risk	Operational Risk Loss Analysis	·	·	✓	✓	·	✓	✓	✓	·	·
	Rel	Customer Complaints Analysis	·	·	✓	✓	·	✓	✓	✓	·	·
	Comp	Foreign Financial Account Analysis	·	·	✓	✓	·	✓	✓	✓	·	·
	Rel	Market Analysis	·	·	✓	✓	·	✓	✓	✓	·	·
	Comp	Suspicious Activity Analysis	·	·	✓	✓	·	✓	✓	✓	·	·
	Comp	Transaction Activity Analysis	·	·	✓	✓	·	✓	✓	✓	·	·
	A&L	Income Analysis	·	·	✓	✓	·	✓	✓	✓	·	·
	Prft	Product Analysis	·	·	✓	✓	·	✓	✓	✓	·	·
	Risk	Authority Profiling	·	·	✓	✓	·	✓	✓	✓	·	·
Market Risk	A&L	Equity Position Exposure	·	✓	·	✓	·	✓	✓	✓	·	✓
	Risk	Market Risk VaR Analysis	·	✓	·	·	·	·	✓	·	·	·
	Risk	Value At Risk Analysis	·	✓	·	·	·	·	✓	·	·	·
	Risk	Equity Exposure Analysis	·	✓	·	·	·	·	·	·	·	·
	Risk	Product Risk Analysis	·	✓	·	·	·	·	·	·	·	·
Liquidity Risk	Risk	Liquidity Risk Monitoring	·	✓	·	·	·	·	✓	·	·	·
	Risk	Liquidity Risk Regulatory Standards	·	✓	·	·	·	·	✓	·	·	·
	Risk	Liquidity Risk Analysis	·	✓	·	✓	·	✓	✓	✓	·	✓
Structure Of Capital	A&L	Capital Allocation Analysis	·	·	·	✓	·	·	✓	✓	·	·
	Comp	Financial Capital Adequacy Analysis	✓	✓	✓	✓	✓	✓	✓	✓	✓	·
	Comp	Structure Of Regulatory Capital Analysis	·	·	·	✓	✓	·	✓	✓	✓	·
	A&L	Financial Management Accounting	·	·	·	✓	·	·	✓	✓	·	·
	Prft	Business Procedure Performance Measurement	·	·	·	✓	·	✓	✓	✓	·	✓

Application Solution Templates



Application Solution Templates (ASTs) are designed to show how the data contents of the Basel II/III risk components overlay BDW. While BSTs are concerned with showing how reporting functions relate to BDW, ASTs are concerned with showing how non-reporting risk components relate to BDW. ASTs are available for each specific risk component as defined in the Basel II/III Framework. ASTs include:

- Capital Adequacy & Capital Ratios
- Capital Adequacy Framework (CAF) Final Rule
- Concentration Risk
- Counterparty Credit Risk (CCR)
- Credit Risk - Internal Ratings Based (IRB)
- Credit Risk - Standardized Approach
- Effective Maturity (M)
- Expected Loss (EL) And Provisions
- Exposure At Default (EAD)
- Global Capital Framework
- Liquidity Risk Management
- Loss Given Default (LGD)
- Market Risk – Internal Model
- Market Risk – Standardized
- Market Risk Capital Requirement
- Market Risk Incremental Risk Charge (IRC)
- Operational Risk
- Probability of Default (PD)
- Securitization Framework
- Stress Testing & Scenario Analysis
- The First Pillar – Minimum Capital Requirements
- Systemic Risk

Each AST gives a complete breakdown of the data requirements of each risk component, as it is defined in the Basel II/III Framework documentation. In addition, there are detailed mappings from each AST member to the equivalent BDW entities and attributes.

ASTs assist financial institutions in their analysis of the overall requirements of each risk component for their specific needs. Once this analysis is complete, the financial institution will map these risk requirements back to BDW and identify the data warehouse subset needed to support the data for their Basel II/III risk calculation needs.

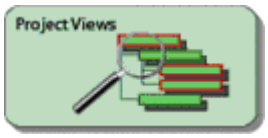
In this release, we have enhanced support for:

- Capital requirements for the trading book
- Complex securitization exposures
- Capital requirements for stressed value at risk (sVaR)

BDW includes a detailed list of AST objects below to address the above requirements:

- Application Modules Market Risk - Incremental Risk Charge (IRC)
- Market Risk - Internal Model
- Market Risk - Standardized and Market Risk Capital Requirement

BDW Project Scopes



BDW project scopes are a series of business subject area views that span across all BDW component models, giving BDW users a clear understanding of the data coverage required in BSTs for specific business requirements or in ASTs for specific data calculation input requirements. BDW includes an extensive set of project scopes specific to Basel II. These Basel II/III project scopes address the specific reporting requirements as identified in the Pillar 3 tables for quantitative disclosures, as well as covering other reporting requirements to assist in the Supervisory Review for Pillar 2. The project scopes also identify specific data elements required for Pillar 1 Risk Calculations on the BDW ASTs. Certain elements in the ASTs are common to many risk calculations. However, some subelements are specific to a particular calculation requirement only. ASTs are structured to show reuse of the components and the project scopes highlight the subset of those elements required for a particular calculation.

BDW project scopes provide a filtered view across the data mart and data warehouse structures for specific Basel II/III reporting requirements.

Each project scope is anchored on a particular BST or AST, but only selects the subset of elements specifically needed to address the particular Basel II/III data or reporting requirement. The scope of each BDW project scope can then be extended to the data warehouse model using the predefined mappings between the BST, AST and BDW Models. In this way, the subset of the data warehouse required to support a particular project can be identified.

The specific project scopes added in BDW 8.4 for Basel II/III support include:

- Basel II - Revisions To Market Risk Framework
- Basel II Trading Book Incremental Risk
- FFIEC 101
- FFIEC 101 Schedule A
- FFIEC 101 Schedule B
- FFIEC 101 Schedule C – J
- FFIEC 101 Schedule K – O
- FFIEC 101 Schedule P – Q
- FFIEC 101 Schedule R
- FFIEC 101 Schedule S
- FFIEC102 - Market Risk Capital Charges.
- Market Risk Capital Charge - SCHEDULE 1
- Basel III Liquidity Risk Management Framework
- Basel III Liquidity Risk Monitoring
- Basel III Liquidity Risk Regulatory Standards
- Basel III The Global Capital Framework

Below is the summary of BDW project scopes for Basel II/III.

Views Supporting Basel II Pillar 1

Basel II P1 CCR Current Exposure Method CEM
Basel II P1 CCR Internal Model Method IMM
Basel II P1 CCR Standardized Method SM
Basel II P1 Counterparty Credit Risk
Basel II P1 Effective Maturity
Basel II P1 Expected Loss & Provisions
Basel II P1 Exposure At Default
Basel II P1 IRB Credit Risk
Basel II P1 Loss Given Default
Basel II P1 Operational Risk
Basel II P1 Probability Of Default
Basel II P1 Securitization Framework
Basel II P1 Short-Term MA In IRB Approach
Basel II P1 Standardized Cntprty Risk Weights
Basel II P1 Standardized Risk Weighted Assets
Basel II P1 Treatment Of Double Default

Views Supporting Basel II Pillar 2

Basel II P2 Collateral Management
Basel II P2 Credit Loss Allowance Analysis
Basel II P2 Economic Capital Allocation
Basel II P2 Involved Party Exposure
Basel II P2 Location Exposure
Basel II P2 Non Performing Loan Analysis
Basel II P2 Operational Risk Assessment
Basel II P2 Operational Risk Loss Analysis
Basel II P2 Outstandings Analysis
Basel II P2 Portfolio Exposure
Basel II P2 Revolving Credit Facility Scrtzn

Views Supporting Basel II Pillar 3

Basel II P3 T 1 Scope Of The Application
Basel II P3 T 2 Capital Structure
Basel II P3 T 3 Capital Adequacy
Basel II P3 T 4 Allowance for Credit Losses
Basel II P3 T 4 By Sector Or Counterparty Type
Basel II P3 T 4 Credit Risk Exposure Detail
Basel II P3 T 4 Geographic Breakdown
Basel II P3 T 4 Impaired Loan & Allowance
Basel II P3 T 4 Maturity Breakdown
Basel II P3 T 5 Credit Risk Portfolio IRB
Basel II P3 T 5 Credit Risk Portfolio STD
Basel II P3 T 6 Counterparty Credit Risk
Basel II P3 T 6 Credit Risk IRB
Basel II P3 T 6 Credit Risk IRB Equity
Basel II P3 T 6 Credit Risk IRB Retail
Basel II P3 T 6 Credit Risk Losses IRB
Basel II P3 T 6 Credit Risk Losses IRB Advanced
Basel II P3 T 7 Credit Risk Mitigation
Basel II P3 T 9 Securitization Discl Banking Bk
Basel II P3 T 9 Securitization Discl Trading Bk
Basel II P3 T 9 Securitization Disclosure
Basel II P3 T 9 Securitization Early Amrtztn
Basel II P3 T10 Capital Adequacy Disclosure STD
Basel II P3 T11 Capital Adequacy Disclosure IMA
Basel II P3 T11 Operational Risk Standardized
Basel II P3 T12 Operational Risk Basic
Basel II P3 T13 Equity Disclosure Banking Book
Basel II P3 T14 Interest Rate Risk Banking Book

Views Supporting Basel II Pillar 1*

Basel II - Revisions To Market Risk Framework
Basel II Trading Book Incremental Risk

Views Supporting Basel III Pillar 1*

Basel III Liquidity Risk Management Framework
Basel III Liquidity Risk Monitoring
Basel III Liquidity Risk Regulatory Standards
Basel III The Global Capital Framework

Views Supporting Basel II Pillar 3*

FFIEC 101
FFIEC 101 Schedule A
FFIEC 101 Schedule B
FFIEC 101 Schedule C - J
FFIEC 101 Schedule K - O
FFIEC 101 Schedule P - Q
FFIEC 101 Schedule R
FFIEC 101 Schedule S
FFIEC 102 Market Risk Capital Charges

***New views added to this release**

3. BDW Basel II/III Architecture

BDW has complete atomic-level structures in place to address credit, market, operational and liquidity risk approaches specified in the Basel II/III Framework for Pillar 1 Minimum Capital Requirements. As well as providing the necessary atomic data structures, BDW has significant support for the aggregations required by Basel II/III in the Summary Area of the model.

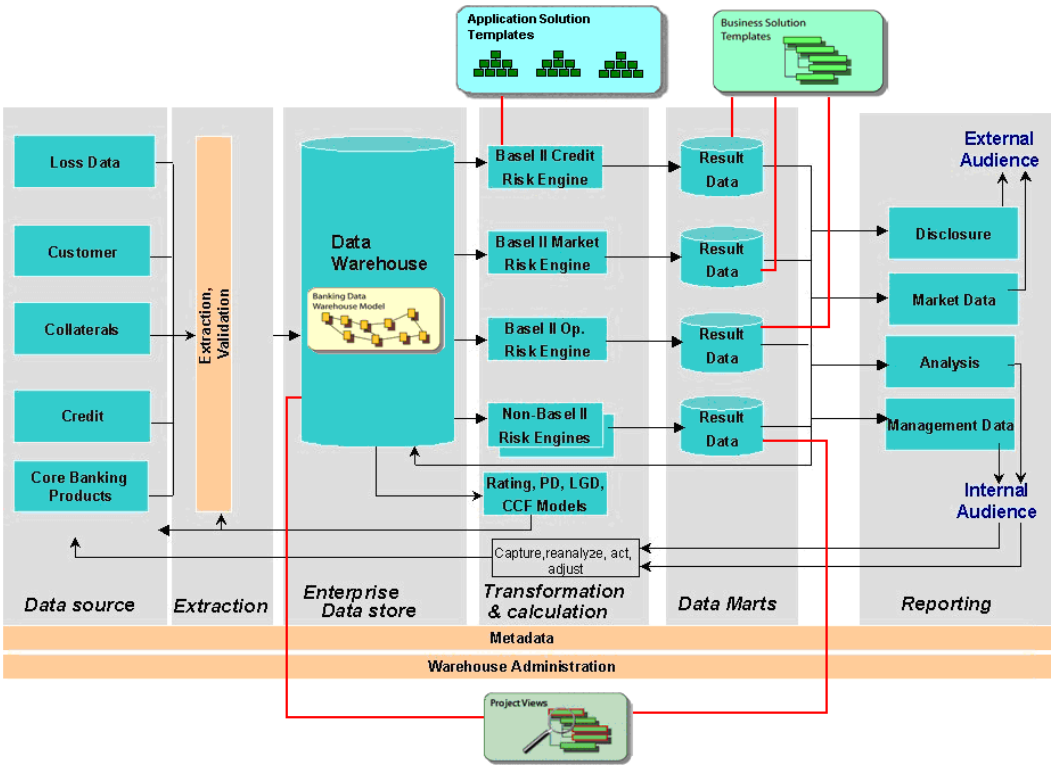
BDW provides a set of integrated models to address all aspects of a data warehouse structure for Basel II/III.

The BDW components work together as a set of complementary content models aimed at solving distinct management information business requirement and data architectural issues. The individual elements within each model component can be mapped to elements in other components to show the traceability from one information consideration to another. For example, a dimension in the BST model (the BI perspective) may be mapped to the FSDM element that supports it from an enterprise information perspective, and also mapped to the BDW attribute that is the source for the data to be loaded into a data mart. These attributes map the information required by a business user (measure) to the data storage maintained by a technical user (database attribute). By presolving problems such as these, the financial institution is left free to concentrate on the real management information and BI issues:

The BDW components are designed to provide a financial institution with the means to build the most extensible and effective Base II/III data structures

- Sourcing the data
- Defining how data should be transformed and aggregated
- Improving data quality management within the organization

The figure below shows a standard Basel II/III architecture as defined by IBM. This architecture outlines the six tiers of functionality needed to support Basel II/III.



The IBM Basel II & Basel III architecture provides a complete framework for all Basel II & Basel III projects

- **Data Sources**
  The internal and external sources of all data required for Basel II/III
- **Extraction**
  The processes and technology needed to extract the data from the potentially diverse sources in an efficient and timely manner
- **Enterprise Data Store**
  The repository into which all the detailed data needed for Basel II/III is gathered
- **Transformation and Calculation**
  The carrying out of various calculations by specialist risk applications
- **Data Marts**
  Aggregated data for reporting and analysis
- **Reporting**
  The creation and delivery of the Basel II/III reports to the various user groups

A data warehouse or Basel II/III data store is seen as the consolidation point for all the necessary data as it is extracted from potentially many different sources

The figure also shows how the BDW components described in this document are overlaid on this Basel II/III architecture:

- BDW provides the design for the enterprise data store.
- BSTs provide the foundation for the reporting and analysis requirements of Basel II/III.
- ASTs describe the required data structures for the Credit Risk components.
- The BDW project scopes provide a filtered view across BDW. Each view addresses specific Basel II/III requirements as defined in the Basel II/III Framework.

4. BDW Support for International Directives Based on Basel II/III

International Capital Adequacy Framework

Basel II provides the core guidelines for many international capital adequacy directives for example – CAF & CRD

As Basel II defines CAF, the regulatory authorities in each jurisdiction interpret and specialize those Basel II/III rules for their own market and use it as an influence to enhance their existing CAFs. BDW supports many major directives, as explained below. While this section focuses on the directives in some of the major jurisdictions, BDW has been designed to support the general requirements of Basel II/III and therefore the basic requirements of other jurisdiction directives will also be met.

European Capital Requirements Directive

The European Commission is the executive of the European Union. Alongside the European Parliament, the Council of the European Union, it is one of the three main institutions governing the Union. One of its primary roles is to propose and implement legislation for the EU.

The Committee of European Banking Supervisors (CEBS) is an advisory body of the European Commission on banking policy issues, currently focusing on the implementation of the Capital Requirements Directive (CRD). The CRD sets out new rules on capital requirements for financial institutions and investment firms with the aim of making sure that financial institutions' capital is more closely aligned with the risks they face. BDWM and the BST models have extensive support for the data requirements of the CRD as they are closely aligned with the data requirements defined in Basel II/III. BDWM offers extensive support for the capture of information such as the capital requirements, risk-weighted asset and exposure details including parameters for:

- Probability Of Default (PD)
- Maturity (M)
- Exposure At Default (EAD)
- Loss Given Default (LGD)
- Expected Loss (EL) calculations

Also covered are the approaches to:

- Credit Risk
- Operational Risk
- Securitization and Equity Risk
- Financial Instruments
- Counterparty details
- Credit Risk Mitigation (CRM)
- Eligible Collateral Management
- Rating Agencies
- External, Internal and Inferred Ratings
- Risk Scores
- Risk Weights
- Account Status
- Portfolios
- Securitizations
- Operational Risk information, including
    - Business lines
    - Event types
    - Gross exposure amounts
    - Write-offs and recoveries
    - Assessment information
    - Loss information

5. Basel II - Refining the Capital Requirement for Market Risk and US FFIEC 101/102 Support

- **FFIEC 101**
  Reporting Schedules A through S collect information about the components of reporting entities regulatory capital, risk-weighted assets by type of credit risk exposure under the Advanced Internal Ratings-based Approach, and risk-weighted assets and operational losses under the Advanced Measurement Approach.
- **FFIEC 102**
  The proposed reporting schedule collects information on reporting entity value-at-risk (VaR) measures, specific risk charges and market risk exposures that pertain to the regulatory capital requirements for market risk under the federal banking agencies' proposed revisions to their existing market risk capital framework.

The FFIEC 101 report is arranged into the following schedules:

- **Schedule A**
  Risk-based capital numerator and ratios for financial institutions, bank holding companies and savings associations.
- **Schedule B**
  Summary risk-weighted asset information for financial institutions approved to use advanced internal ratings-based and advanced measurement approaches.
- **Schedules C – J**
  Cover all wholesale exposures as defined in the advanced approaches rules: Corporate, Bank, Sovereign, Income Producing Real Estate, High Volatility Commercial Real Estate, Eligible Margin Loans, Repo-Style Transactions or OTC Derivatives.
- **Schedules K – O**
  Cover all retail exposures as defined in the advanced approaches rules.
- **Schedules P – Q**
  Cover all Securitization Exposures as defined in the advanced approaches rules.
- **Schedule R**
  Covers all Equity Exposures as defined in the advanced approaches rules.
- **Schedule S**
  Covers Operational Risk as defined in the advanced approaches rules.

The reporting elements identified in schedules A-S are supported as measures or dimensions in the BSTs. BSTs required to support FFIEC 101 are as follows:

- **Advanced Risk Based Capital Analysis**
  Schedule A
- **Advanced IRB And AMA Analysis**
  Schedule B

- **Credit Risk Exposure Analysis**
  Schedule C – J
- **Securitization Detail Analysis**
  Schedule P – Q
- **Equity Exposure Analysis**
  Schedule R

Across each BST, a new project scope has been created to highlight the specific set of measures and dimensions relevant to each FFIEC 101 Schedule. For the FFIEC 102 report, two BSTs are required to support the reporting elements:

- **Market Risk Capital Charges Analysis**
  Schedule 1
- **Market Risk VaR Analysis**
  Schedule 1

A separate project scope, Market Risk Capital Charge – SCHEDULE 1, has been created to highlight the specific set of measures and dimensions relevant to FFIEC 102.

BDW includes support for Incremental risk in the trading book, as follows:

- Support for the revisions detailed in the Basel Committee on Banking Supervision (BCBS) directive *Guidelines for computing capital for incremental risk in the trading book* (BCBS 159, July 2009) have been made in this release. A new BST for Basel II, Incremental Risk in the Trading Book, has been added to support the above Basel II specification.
- For Market Risk, Incremental Risk Charge (IRC), an AST containing data items required for the calculation of a capital charge to the financial institution's trading book that is incremental to the firm’s general market risk (GMRC) and specific risk charges (SRC).

Revisions to market risk framework include:

- Support for the revisions detailed in the BCBS directive *Revisions to the Basel II market risk framework - final version July 2009*, which have been made in this release.
- Market Risk Capital Requirement AST containing data items required for the calculation of total market risk capital charge to the financial institution's trading book using the stressed VaR approaches.

6. Basel III – Liquidity Risk Management, New Capital Requirements and Changes to Counter-party Credit Risk

BDW 8.4 has been enhanced to include support for the BCBS directives:

- Basel III – International framework for liquidity risk measurement, standards and monitoring
- Basel III – A global regulatory framework for more resilient financial institutions and banking system

Under this requirement, regulatory liquidity risk reports must be produced at least monthly to be delivered weekly or even daily when required by regulators. The challenge financial institutions will therefore face is to consolidate exposures, liabilities, counter parties and market data in a centralized risk data warehouse, while identifying the subset of that information that must be reported daily. All contractual cash flows in portfolio should be made available and financial institutions should have the ability to stress those and produce liquidity gap analysis according to various scenarios. The LCR run-off rates as well as Net Stable Funding Ratio (NSFR), Available Stable Funding (ASF) and Required Stable Funding (RSF) factors depend on such information, which is usually only available in risk-specific data warehouses and not in treasury systems.

The next challenge financial institutions face is to interface their current risk and finance systems with third-party risk engines to meet the new Basel III LCR requirements. Different LCR ratios will have to be produced per consolidation level and currencies under varied idiosyncratic stress scenarios. BDW supports the above KPIs and reporting requirements in this release using BSTs to identify and document the individual elements required in the reports.

The following BSTs provide support for the new Basel III requirements:

- **Short Term Liquidity Analysis**
  Promotes resilience over short-term time horizons by creating additional incentives for financial institutions to fund their activities with more stable sources of funding on an ongoing structural basis.
- **Long Term Liquidity Analysis**
  Promotes resilience over long-term time horizons by creating additional incentives for financial institutions to fund their activities with more stable sources of funding on an ongoing structural basis.
- **Liquidity Risk Monitoring**
  Reports the metrics which assist in consistent monitoring of financial institution’s liquidity. These metrics capture specific information related to a financial institution’s cash flows, balance sheet structure, available unencumbered collateral and certain market indicators.
- **Foreign Currency LCR Analysis**
  Captures potential currency mismatches, financial institutions and supervisors should monitor the LCR in significant currencies. This allows the financial institution and the supervisor to track potential currency mismatch

issues that could arise. Foreign currency LCR = stock of high-quality liquid assets in each significant currency/total net cash outflows over a 30-day period in each significant currency. Note that the amount of total net foreign exchange cash outflows should be net of foreign exchange hedges.

- **Available Unencumbered Assets**
  Provides supervisors with data on the quantity and key characteristics, including currency denomination and location, of financial institutions' available unencumbered assets. These assets can be used as collateral to raise additional secured funding in secondary markets and eligible at Central Banks and as such can be additional sources of liquidity for the financial institution.

  Financial institutions are to report the amount, type and location of available unencumbered assets that could serve as collateral for secured borrowing in secondary markets at prearranged or current haircuts at reasonable costs. Likewise, financial institutions should report the amount, type and location of available unencumbered assets that are eligible for secured financing with relevant Central Banks at prearranged (if available) or current haircuts at reasonable costs, for standing facilities only, i.e., excluding emergency assistance arrangements. This includes collateral that has already been accepted at the Central Bank but remains unused. For assets to be counted in this metric, the financial institution must have already put in place the operational procedures to monetize the collateral.

  In addition to providing the total amounts available, financial institutions should also report these items categorized by significant currency. Significant currency is defined as available unencumbered collateral denominated in a single currency, which, in aggregate, amounts to more than 1% of the associated total amount of available unencumbered collateral (for secondary markets and/or Central Banks).Financial institutions must also report the estimated haircut that the secondary market and relevant Central Bank would require for each asset. In the case of the latter, a financial institution would be expected to reference, under business as usual, the Central Bank haircuts it would normally access, which is likely to involve matching funding currency, such as ECB for Euro-denominated funding and Bank of Japan for Yen funding.

  As a second step after reporting the relevant haircuts, financial institutions should report the expected monetized value of the collateral rather than the notional amount and where the assets are actually held, in terms of where in the world the assets are and what business lines have access to those assets.
- **Contractual Maturity Mismatch**
  Analyzes the gaps between the contractual inflows and outflows of liquidity for defined time bands. These maturity gaps indicate how much liquidity a financial institution would potentially need to raise in each of these time bands if all flows occurred at the earliest possible date. This metric provides

insight into the extent to which the financial institution relies on maturity transformation under its current contracts.

- **Concentration Of Funding**
  Identifies the sources of wholesale funding that are of such significance that withdrawal of this funding could trigger liquidity problems. The metric thus encourages the diversification of funding sources.
- **Liquidity Gap Analysis**
  Analyzes the net liquid assets of a financial institution. The excess value of the financial institution's liquid assets over its volatile liabilities. A company with a negative liquidity gap should focus on their cash balances and possible unexpected changes in their values.
- **Liquidity Position Analysis**
  Analyzes the difference between the sum of liquid assets and incoming cash flows on one side and outgoing cash flows resulting from commitments on the other side, measured over a defined period, being the measure of the liquidity risk.

Basel III – Global Capital Framework – Capital Requirements

- BDW supports the new KPIs reflected using analytical requirement Economic Capital Analysis.
- Breakdown of Basel III capital structure is reflected in the AST module Total Regulatory Capital.
- Financial Institution Summary tracks the Basel III capital structure, conservation/additional buffers and capital adequacy ratios.

Basel III – Global Capital Framework – CCR

- BDW supports the creation of new AST application, CCR to support breakdown of CCR calculation parameters. AST module - CVA Risk Capital Charge shows the parameters needed to calculate the capital charge for CCR.
- AST module – Advanced Risk Capital Charge & Standardized Risk Capital Charge using IMM approaches
- CCR Capital Charges Summary measures the Counterparty Credit Risk that the counter party to an over-the-counter (OTC) derivative or a repo-style transaction will default.

BIS continues to monitor the provision against losses for financial institutions and continues to issue regulatory requirements to safeguard the banking world. BDW provides a comprehensive solution for not only helping financial institutions to adhere to the demands in connection with Basel II/III reporting, but also builds on top of these requirements to provide financial institutions with sources for insight that will drive better decisions for prudent management of financial Institution.

This publication is for general guidance only. The BDW brand covers both the Banking Data Warehouse (BDW) and Banking and Financial Markets Data Warehouse (BFMDW) 8.4 releases.