Future regulatory reporting of EU banks

Presentation by **Petr Novák, Platón Karabínoš**

Confidential information for the sole benefit and use of PwC's client.

Context

In recent decades, European banks have faced a growing number of regulatory reporting demands. These include **AnaCredit, BSI, MIR, SHS-S, SHS-G, BIS LBS, IMF SFR, COREP, and FINREP Group,** among others. Adding to the complexity, each country imposes its own distinct requirements and varying derogation policies. Consequently, banks face significant pressure, requiring **additional time, manpower, and financial resources** to meet these regulatory obligations while ensuring **report accuracy and timeliness**.

At the same time, banks have to monitor their **internal business and financial performance and follow the risks**. So, other reports and data were prepared for this use.

In addition to it, banks are **challenged by their shareholders** on the efficiency of supporting functions, where also Finance and Risk departments belong.

To address the complexity of regulatory requirements, the **ECB is leading initiatives such as IReF and BIRD**. These initiatives aim to **simplify data collection processes, streamline reporting procedures, and enhance the overall quality of submitted data** by defining a uniform process for statistical reporting (IReF) as well as a Data model (BIRD).

PwC is deeply involved and can help the banks to **accomplish this reporting journey successfully**.

Petr Novák
Director

Platón Karabínoš
Manager

Content

1

Banks’ challenges in regulatory reporting

Bank’s Regulatory Reporting Hurdles

Challenges in Regulatory Reporting Expressed by Banks

Poor data quality

Inadequate **data quality** in regulatory reporting, **audit findings** even from regulators, potentially leading to significant **compliance risks**.

Complexity in consolidating

Complexity in **consolidating reports across international financial groups,** recent **mergers or acquisitions** or **change of core banking system**.

Short term focus

Absence of a **long-term strategy** in regulatory reporting, new and more **granular reporting requirements**.

Significant effort and/or money

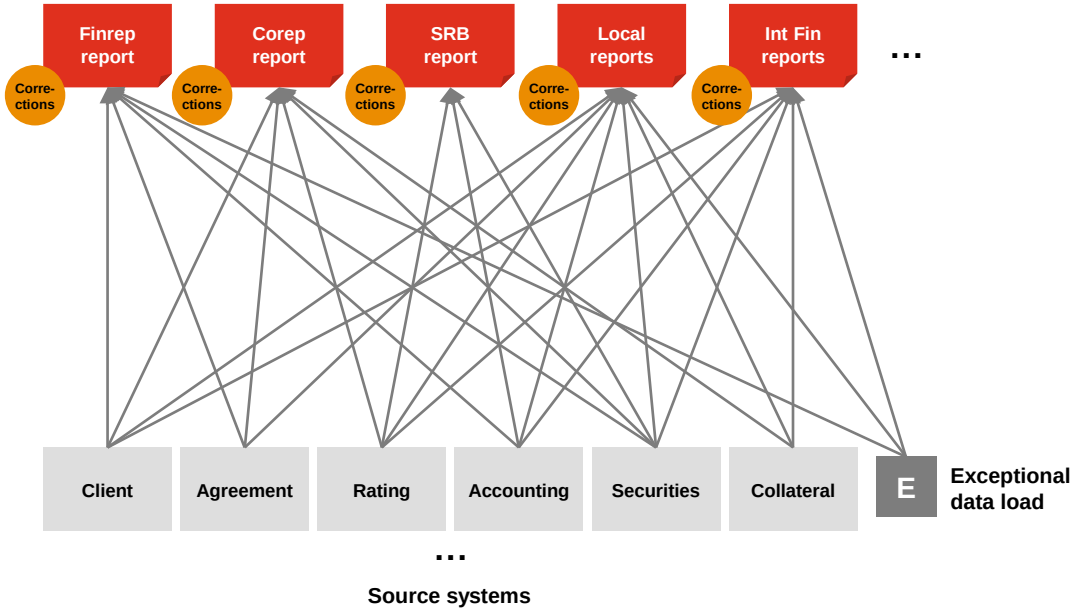
Significant **effort and/or money** spent to prepare, update and run regulatory reporting. Usual **vendor lock** in case of a reporting software package.

Smaller banks’ misery

Overly **complex reporting for smaller banks**. Smaller banks have limited capacity for regulatory reporting.

Usual Reporting Architecture

Complex architecture due to incremental reporting requirements in last years and insufficient coordination among regulators



Description of the usual reporting architecture

Banks load the source data needed for **each report from source systems**. Similar data must be identified multiple times in the source, extracted and loaded to the report. If any problem arises in the source, all the reports are affected.

Or in the better situation, banks have **enterprise data warehouse** storing the source data in a common database. In such case, the data is already loaded here, but the identification of the data for reporting must be realized, too.

Source data has **unstable quality** and therefore the reporting quality is directly hit or reporting teams have to implement specific quality controls.

Data corrections are executed for each report.

All reporting teams must be familiar with **data of source systems**, monitor **changes in source systems** and adapt reporting solution after any change.

2

Overview of Future EU regulatory reporting

Future EU Regulatory Reporting

ECB and other European regulators have organized a common program to ease banks' situation

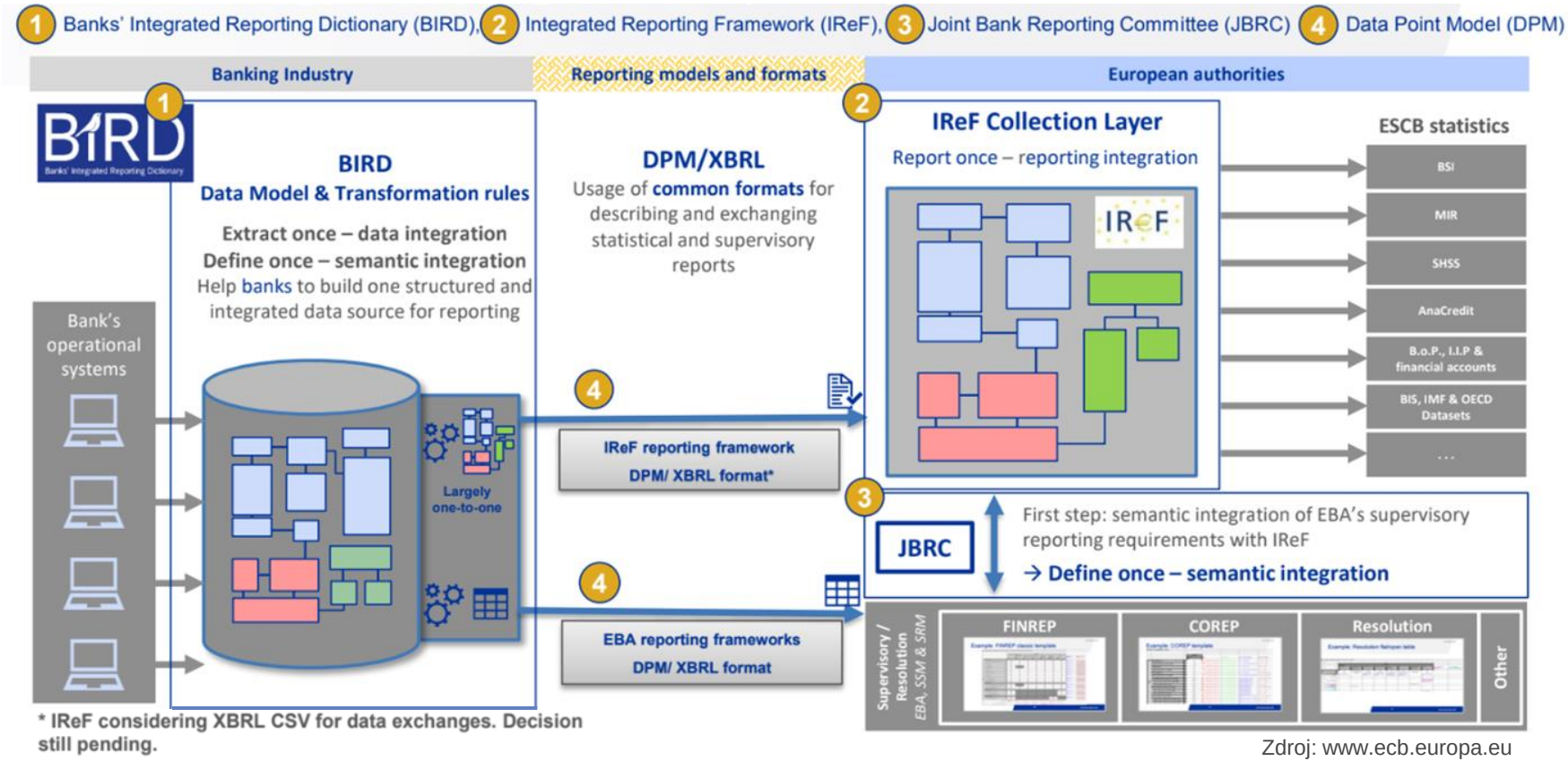
Reducing banks' reporting burden

Initiatives towards integrated reporting

- **Joint Bank Reporting Committee** (JBRC) – European and national authorities
- **Banks' Integrated Reporting Dictionary** (BIRD) – With the banking industry
- **DPM Alliance and XBRL CSV*** – Common reporting format
- **The Integrated Reporting framework** (IReF) – ECSB regulations

* IReF considering the usage of XBRL CSV for data exchanges (decision still pending) – already used for supervisory data by EBA

The strategy for integrated reporting



Zdroj: www.ecb.europa.eu

3

Joint Bank Reporting Committee

Objectives of Joint Bank Reporting Committee

JBRC was established in March 2024

Semantic integration

Identify opportunities for **semantic integration** → preliminary work on a **roadmap** already almost completed.

Common data dictionary

Foster the development **of a common regulatory data dictionary including a (meta) data model for supervisory, resolution and statistical reporting.**

Integrated reporting

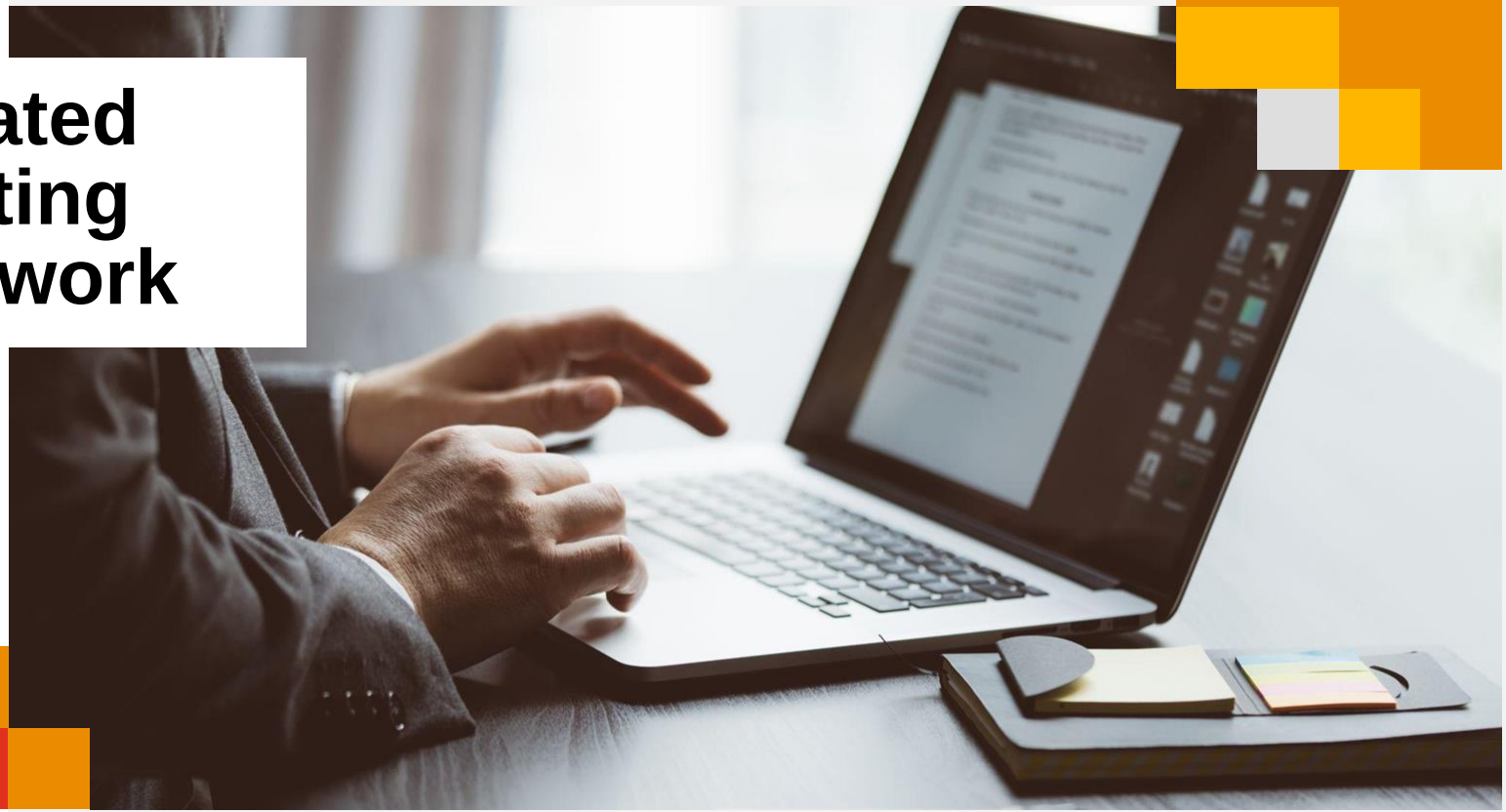
Provide advice and assist in **translating (new) user needs Into integrated reporting requirements.**

Data sharing

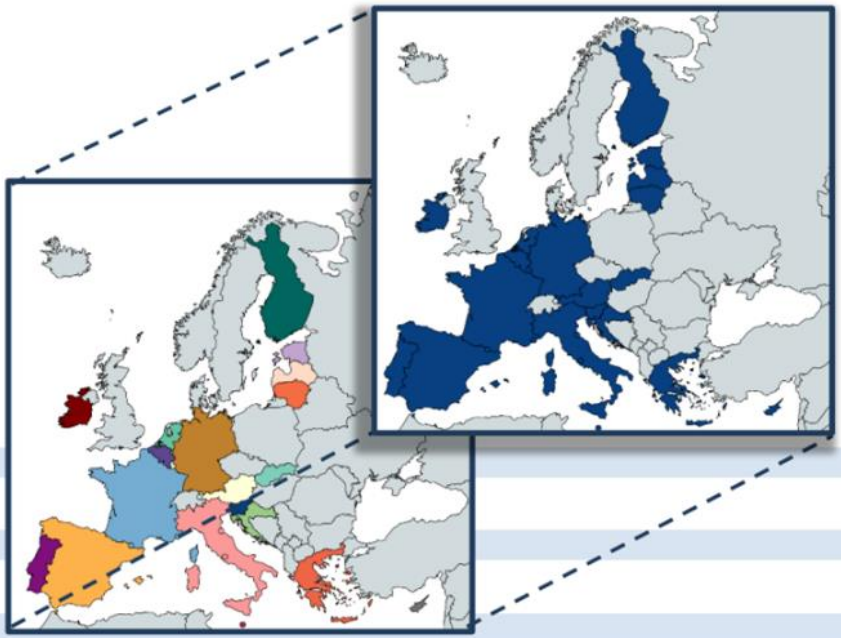
Provide advice on ways to enhance **coordination and data sharing.**

4

Integrated Reporting Framework



Harmonize Statistical Reporting in Eurozone under Integrated Reporting Framework



IReF

Integrated Reporting Framework

The aim of IReF is to integrate statistical reporting content in the euro area. These are currently implemented and described differently in each country. IReF is seen as first step towards a common statistical, prudential and resolution reporting with tangible steps already in this direction.

Zdroj: www.ecb.europa.eu

Regulation in Scope of IReF

Assets	Liabilities
Cash	Deposits
Loans to legal entities	Securities issued and other equity
Loans to natural persons	Derivatives
Debt securities - Equity - Investment fund shares	Remaining liabilities
Unquoted shares and other equity	Capital and reserves
Derivatives	
Non-financial assets	
Remaining assets	

Assets = Liabilities

Off-balance sheet items

Custodian data

Collection of granular credit and credit risk data (AnaCredit **Regulation ECB/2016/13)**
- Reporting population credit institutions, regulation to be repealed.

Balance sheet items of credit institutions and the monetary financial institutions (MFI) sector (**BSI Regulation (ECB/2021/2**)
- Reporting population MFIs and non-MFI credit institutions.
- Money market funds (MMF) will not be included in the IReF Regulation.

Statistics on interest rates applied by monetary financial institutions (**MIR Regulation (ECB/2013/34**)
- Reporting population MFIs excluding MMFs, regulation to be repealed.

Statistics on holdings of securities (**SHS Regulation (ECB/2012/24**)
- Reporting population MFIs, investment funds, insurance companies, financial vehicle companies, custodians and heads of banking groups.
- IREF to include holdings and custodian activities of deposit taking corporations that mirror SHS requirements.

Key Milestones of IReF

2018

Qualitative stock-taking questionnaire on IReF collection aspects to help design scenarios

2019–2021

Cost-benefit Assessment (CBA) questionnaire to identify the optimal scenario for IReF implementation

2021–2023

Publication of the CBA results

2023

- **Complementary CBA** to fill residual gaps
- **Matching of costs and benefits,** leading to the drafting of the IReF regulation

2024

Public consultation on the **IReF Regulation**

2025

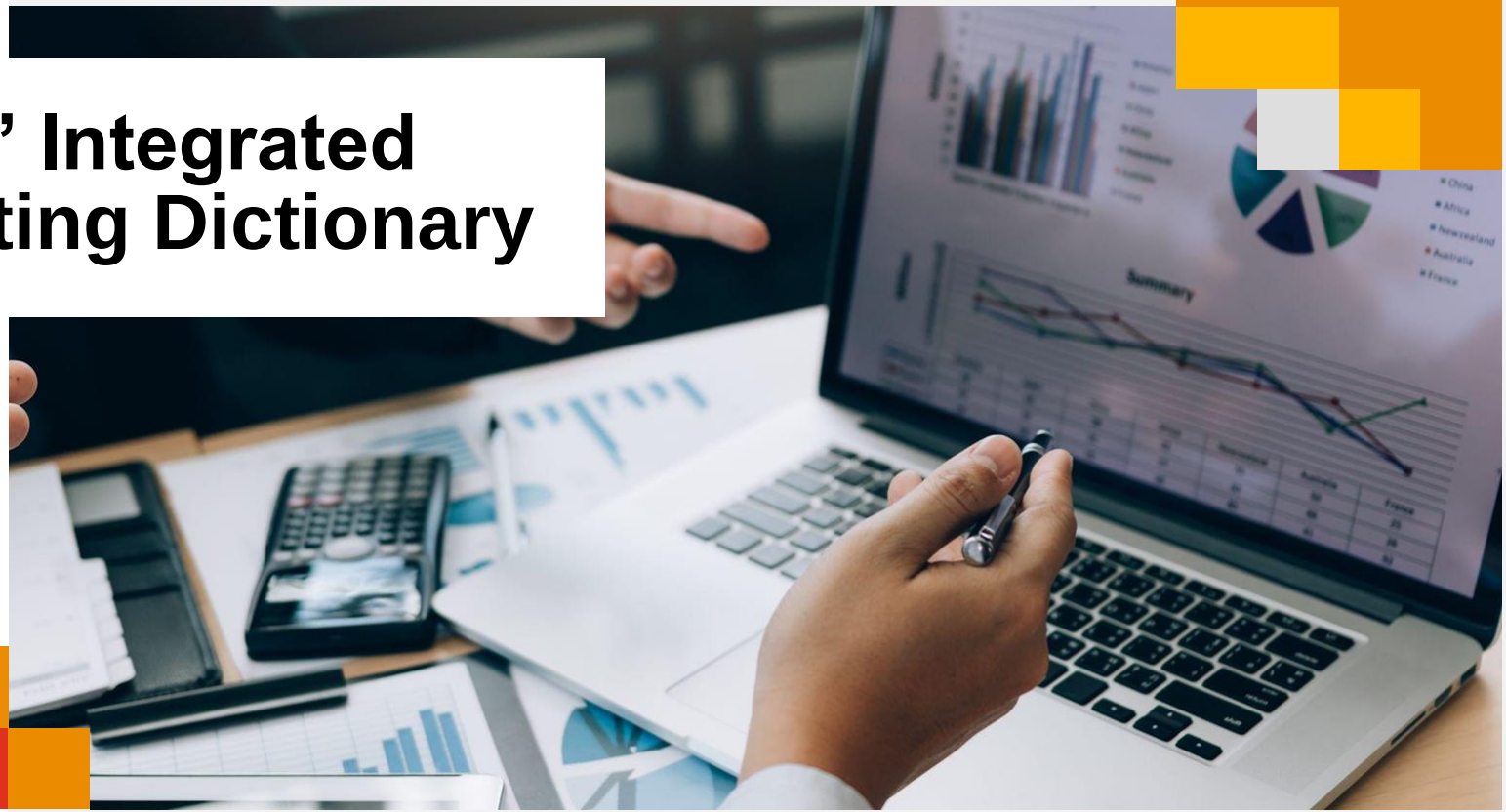
Expected **adoption** of the **IReF Regulation by the Governing Council**

2027

Expected **go live of IReF**

5

Banks’ Integrated Reporting Dictionary

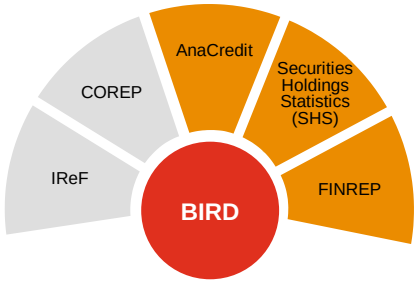


Banks Integrated Reporting Dictionary – BIRD

“Move towards uniform data model for regulatory reporting”

What is BIRD?

- BIRD is a collaborative initiative between the Statistics Committee of the European System of Central Banks (ESCB) and institutes in banking industry
- The aim is to reduce the regulatory burden for banks, foster cooperation in the area of regulatory reporting and improve the quality of data reported to authorities
- For this purpose, BIRD offers a **harmonized data dictionary** and **harmonized data model** specifying how to extract and transform the data from the bank's internal IT systems in order to generate reports required by the authorities



Ongoing work and next steps?

- Analysis and inclusion of IReF together with the updates to FINREP (EBA ITS) as one of the top priorities going forward
- Further work towards full operationalization of the BIRD Transformation Rules
- Feasibility assessment for further integration of COREP and integration of ESG requirements

What are impacts and technical changes?

- BIRD does not impose any new regulatory requirements on banks or changes in IT systems
- However, as the initial step to future regulatory reporting, banks need to assess and decide if they want to join and use the result of the collaborative work in BIRD or to go their own way to implement the new requirements. In the former case banks should asses the compatibility of their data models with BIRD and create a prioritized roadmap for transition to BIRD data model in close alignment with BIRD timeline

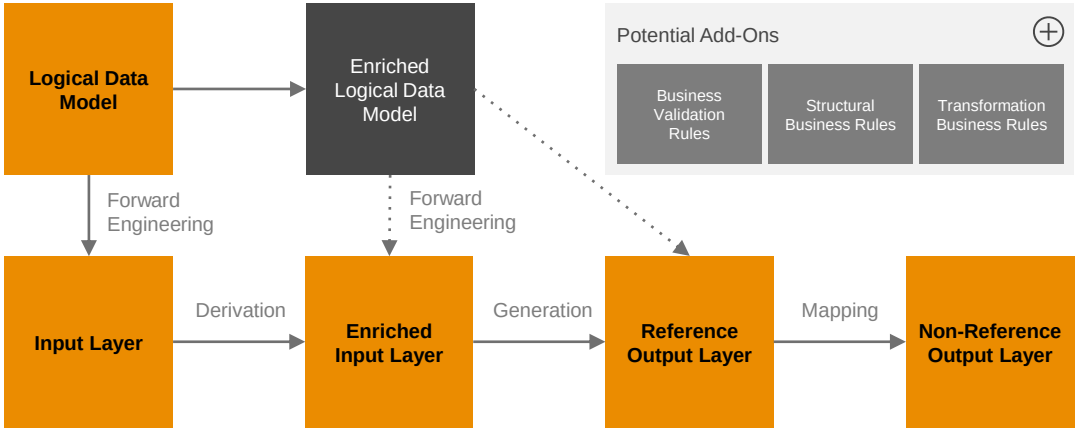
What is the timeline?

2015 Launch of BIRD Pilot for AnaCredit and SHS

2018 First BIRD extension for FINREP EBA ITS and COREP credit risk envisaged

2024 **Release of the latest BIRD Data Models and BIRD Transformation Rules**

BIRD Components



BIRD Methodology consists of

- **BIRD Process:** Which contains the workflow from Input to Output, divided into logical and physical level.
- **BIRD Components:** Which contains the building blocks of BIRD consisting of data structure components and connecting components

BIRD components consist of

Data Structure Components

- The BIRD Logical Data Model (LDM)
- The BIRD Enriched Logical Data Model (ELDM)
- The BIRD Input Layer (IL)
- The BIRD Enriched Input Layer (EIL)
- The Reference Output Layer (ROL)
- The Non-Reference Output Layer (NROL)

Connecting Components

- Transformation rules:
  - Derivation Transformation Rules
  - Generation Transformation Rules
- Mappings
- Forward engineering (meta)data lineage
- Validation rules

Logical Data Model, Input Layer and Reference Output Layer as BIRD data-structured components

The BIRD process is the envisaged workflow from input to output, in which data structure components are linked to each other via connecting components. Below are data-structured components in BIRD, so called Layer, that describe the various steps from input to output

BIRD

BIRD Data Structure Components

Logical Data Model

The BIRD logical data model is a **detailed logical model** that:

- provides a **description of the necessary business requirements** and
- **their relationships**, helping users understand them for reporting purposes. It contains extensive and complete information about business concepts that are relevant for fulfilling the regulatory reporting requirements and to be provided as “raw” data.

Input Layer

The BIRD Input Layer (IL) serves as a blueprint for a **physical interface model that is derived** (i.e. forward engineered) **from** the BIRD **LDM**.
It is:

- more compact and
- easier to browse but
- less informative than the LDM.

  The model omits several structural properties. It could be the **starting point for technical implementation** of BIRD.

Reference Output Layer

The Reference Output Layer (ROL) describes the original regulatory reporting requirements using the standardised BIRD “reference” codes and descriptions. The ROL is a syntactically and semantically integrated version of the original reporting requirements.

Enriched Logical Data Model, Enriched Input Layer and Non-Reference Output Layer as BIRD data-structured components

The BIRD process is the envisaged workflow from input to output, in which data structure components are linked to each other via connecting components. Below are data-structured components in BIRD, so called Layer, that describe the various steps from input to output

BIRD

BIRD Data Structure Components

Enriched Logical Data Model

The BIRD Enriched Logical Data Model (ELDM) is **an expanded version of the BIRD LDM** that incorporates **all the attributes (variables) obtained through Derivation Transformation Rules**.

A specific instance of this is the categorization of enterprise size (such as small and medium-sized enterprises), which is determined based on attributes present in the LDM, such as the number of employees and annual turnover.

Enriched Input Layer

The BIRD Enriched Input Layer (EIL) is **an enhanced version of the BIRD IL** that **encompasses all the attributes (variables) obtained through Derivation Transformation Rules.** The EIL is derived from the ELDM through forward engineering.

Non-Reference Output Layer

The Non-Reference Output Layer (NROL) describes the original regulatory reporting requirements using “non-reference” codes and descriptions, and thus using the codification systems of the related regulation (e.g. from the EBA’s DPM).

Transformation Rules, Mapping, Forward Engineering and Validation Rules as BIRD connecting components

The BIRD process is the envisaged workflow from input to output, in which data structure components are linked to each other via connecting components. Beside structure components, there are connecting components that define the procedures and methods connecting elements across BIRD layers along the overall process

BIRD

BIRD Connecting Components

Transformation Rules

Transformation rules describe operations to enrich information and create reports in BIRD. These rules can be expressed in either logical/semantic language. The primary focus is on writing transformation rules in logical/semantic language to assist business users in their tasks and to provide a straightforward yet formal business perspective to technical users who utilize them as a blueprint.

Forward engineering

Forward engineering (meta)data lineage describes the links between the logical and physical layer, i.e. which entities of the LDM or ELDM have been combined (“wrapped up”) into a certain table of the IL or EIL, respectively.

Mapping

Mappings serve as a specific category of transformation rules that are essential for converting dictionaries that lack semantic integration into the “reference” dictionary of BIRD. The “non-reference” dictionaries utilized in the NROL contain distinct definitions, concepts, and codes that require mapping to align with the “reference” dictionary of BIRD.

Validation Rules

Validation rules in BIRD are checks embedded within the logical structure of the LDM. Additional explicit validation rules can be introduced to improve consistency and integrity in BIRD layers. Structural validation rules ensure consistency in simplified layers like IL/EIL, while business validation rules enhance data quality and provide insights to users.

BIRD Logical Data Model

BIRD LDM describes BIRD process at the logical level

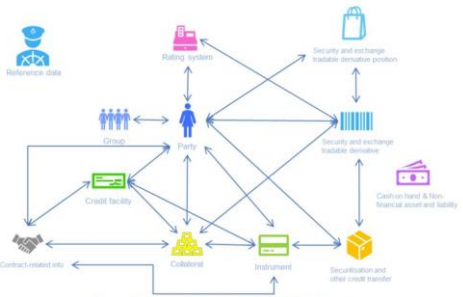
Definition & Characteristics

Definition

The BIRD Logical Data Model (LDM) is a data model that outlines the necessary data for fulfilling the reporting requirements as per the BIRD documentation. It focuses on “what needs to be reported” and ensures a redundancy-free, semantically integrated description of the data elements.

Basic concepts

- The LDM does not prescribe “how it needs to be reported or processed”.
- The LDM represents a Snapshot at the Reference date.
- The LDM distinguishes between different types of Reporting agents.
- The LDM does not cover the logic to consolidate different Parties into one consolidated group based on their relationships to each other.
- The LDM is documented using SQL data modeler and is based on SMCube methodology.



Design Principles

Concerns separation	**Requirement modelling**	**Modelling of least granular option**	**Usage of business language**
No abbreviations	**As explicit as possible**	**Satisfy the third normal form**	**Usage of subtyping**
Roles of entities modelling	**Attributive entity types for specific traits**	**Generalizations for objects with common traits**	**Associative entities for n:n**
Relationships are explicit as possible	**Numbers are not numeric**	**Usage of indicators instead of Boolean**	**Top down, Left to right.**

BIRD Input Layer

BIRD IL describes BIRD process at the physical level

Definition & Characteristics

Definition

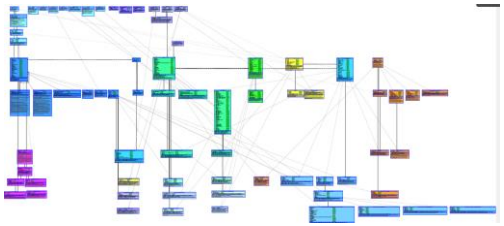
The BIRD Input Layer (IL) is intended to act as an implementation model derived from the LDM via so called forward engineering methods which we define as a combination of denormalization and additional (validation) rules to ensure “semantic equivalence” between the LDM and the IL.

Basic concepts

IL acts as an implementation model derived from LDM

IL is derived from LDM through forward engineering methods, which are combination of denormalization and additional (validation) rules

Validation rules are used to preserved and ensure the consistency of information derived from LDM



Forward engineering method & Validation rules

Forward engineering methods

- General considerations:
  - Treatment of optionality for enumerated and non-enumerated attributes/columns
  - Conserving referential integrity (via validation rules & Null Explanatory Values [NEVs])
- Merging entities into tables:

Merging entity types into tables	Merging entity types into a supertype/ subtype	Merging entity types connected via relationship types	Merging tables with equals surrogate keys

Validation rules

To preserve this information (i.e., structural constraints) from the LDM for the IL, that gets lost because it merges all subtypes into one table, validation rules have to be recreate and applied. The file with constraints on the relationships has the following json keys:

Validation rule with constraints on the relationships	Validation rule with constraints on the relationships
Json keys: Type, Table, Entity, Relationship	Json keys: Table, Type, Attr, Comparator, OriginalEntityName, Entities, Value, OriginalValueName, assetComparator, AssertValue

Example

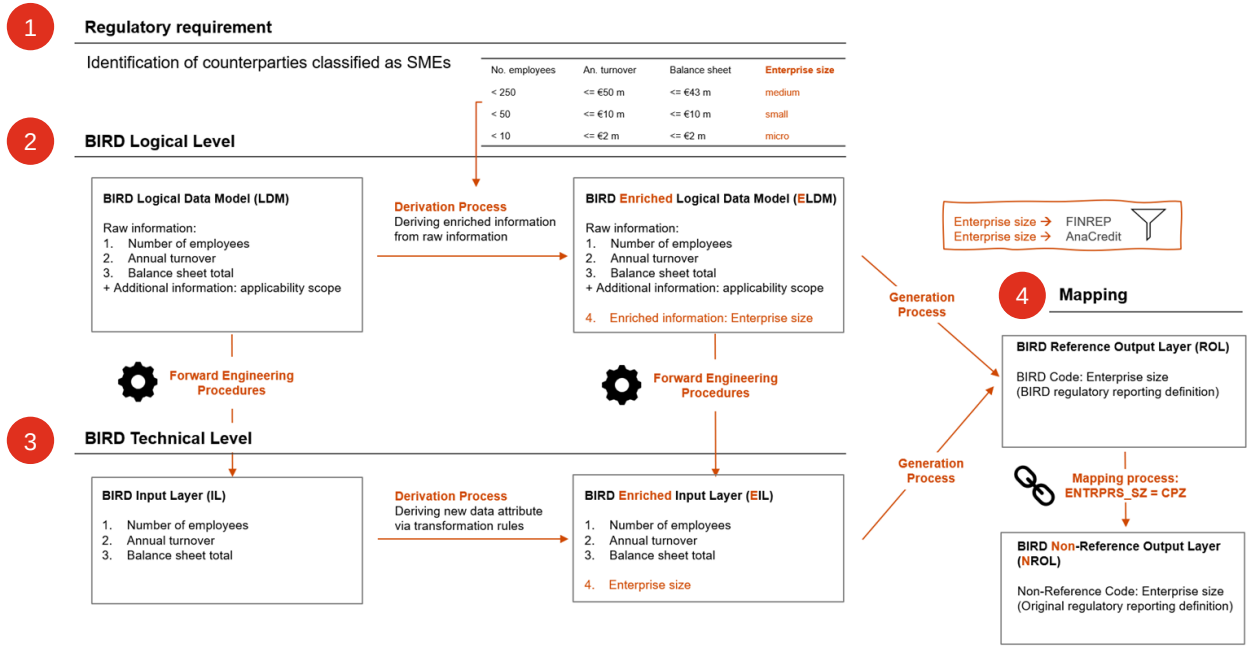
Navigating the BIRD process from input to output

1. To fulfil FINREP reporting requirement, a bank shall identify whether a counterparty is classifiable as small and medium enterprise (SME) based on predefined set of criteria (size and turnover).

2. BIRD Logical Level contains “raw” information abound the business concepts as well as enriched information needed for reporting, which is derived from the “raw” information.

3. BIRD Technical Level contain the same business concepts structured in a more compact way. They are created from the Logical Level via forward engineering procedures.

4. Via mapping process, enterprise size attribute in BIRD dictionary is linked to the corresponding attribute for enterprise size in the EBA DPM.



6

Data Point Model

DPM an Authority of Common Standards in Data Modeling

Rational for ECB potential use of EBA Data Point Model (DPM)

- Banks call for progressing on the integration of existing data dictionaries.
- A unique "container" for statistical and supervisory reporting dictionaries increases efficiencies.
- DPM 2.0 serves as target solution for hosting and documenting to the public the IReF models.

The DPM Alliance - Building a common governance for DPM metamodel and tools

The DPM Alliance is a **joint framework for collaboration on the evolution of the DPM Standard Products**, so that it **fulfils the needs of the authorities, increasing efficiencies and developing efficient processes for defining, collecting and exchanging data among all stakeholders**

Sponsors: EBA, EIOPA and ECB (other European Organizations may join later)
Stakeholders: NCBs/NSAs/CAs, reporting agents, reporting service providers

The **Memorandum of Understanding (MOU) on the establishment of a common Data Point Model (DPM) Governance framework - "DPM Alliance"** defines the following aspects:

- The high-level collaboration terms
- Establishing the DPM governance bodies
- The DPM Standard Products
- Promotion of the standard, public communication policy and intellectual property rights
- No separated budget. Resources shared among parties: mainly staff time and technical infrastructure

DPM Standard Products - What's included?

1

DPM Standard products including, but not limited to, technical standards, metamodels, and implementation tools.

a) Technical standards may include metadata models, various technical formats and architecture design for data and metadata exchange. DPM Standard will aim to bring such standards to the International Organization for Standardization (ISO) for review and endorsement.

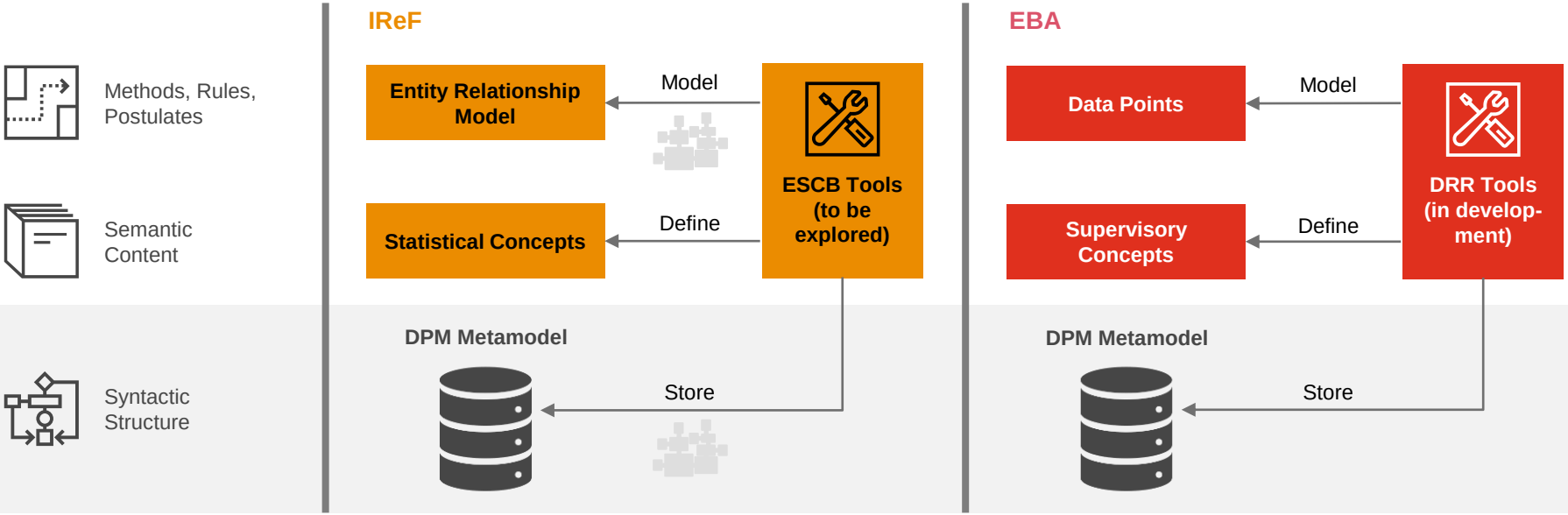
b) Implementation tools may involve open-source software and techniques that can assist users wanting to implement DPM Standard products and to develop dictionaries using the DPM methodology, for example, in creating definitions of reporting frameworks, making use of code lists, generating XBRL Taxonomies and other reporting formats.

2

Promotional and educational material may include public statements, presentation material to be used by Sponsor Organisations for the promotion of DPM Standard, user manuals, various help notes, and public discussion fora amongst users.

Building the Foundation

DPM Metamodel as the Only Common Component



The adoption of DPM Refit as metamodel will facilitate the semantic integration work

7

PwC BIRD+ for Banks in Eurozone

Supporting Banks in Regulatory Reporting

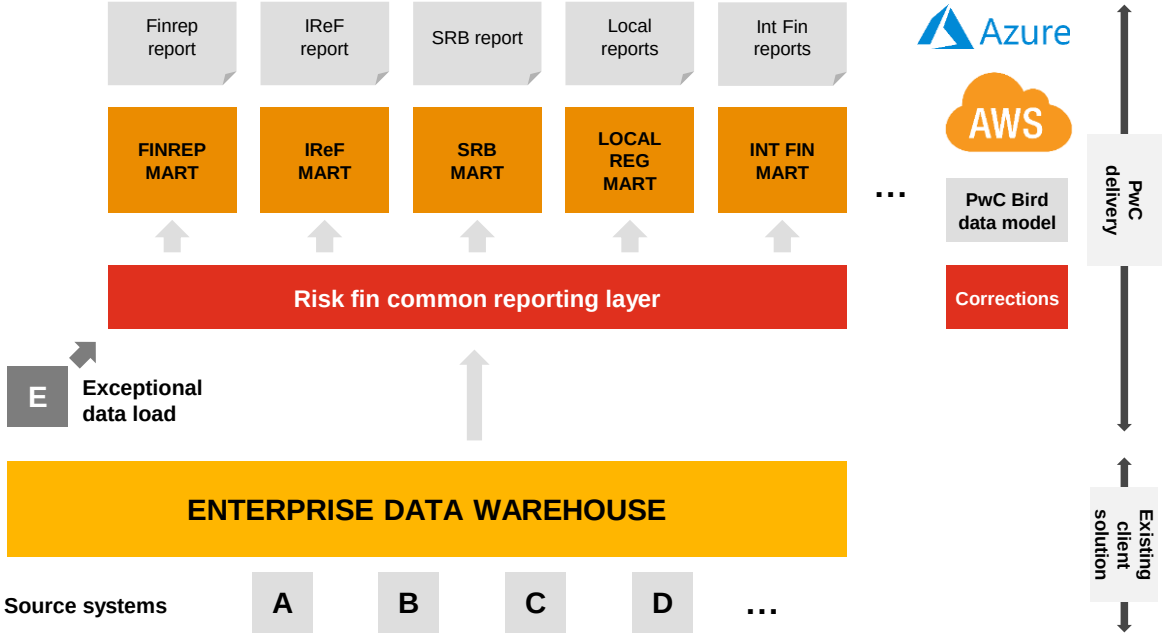
- PwC operates their offices in **all countries of Eurozone** and support banks in their development
- PwC traditionally supports banks in **implementing regulatory reporting**
- PwC has recognized the **importance of ECB BIRD** development specifically in the lights of coming IReF
- In autumn 2023, PwC established a **dedicated international workstream** with more than 40 participants
- PwC **communicates with banks about BIRD and IReF**
- PwC is a dedicated member of **BIRD working streams**, ensuring PwC stays at the forefront of developments and bring these to the client banks.

Accelerating BIRD Implementation in Banks with PwC BIRD+

PwC can contribute to **inhouse implementations** of BIRD in banks thanks to:

- PwC solution is **platform-independent**, providing flexibility and adaptability.
- PwC has been preparing implementation accelerators:
  - Directly **leverage initiatives from ECB** for a streamlined process.
  - Maintain full **control over your reported data**, ensuring accuracy and compliance.
  - Efficiently create and **manage data storage,** and generate regulatory reports.
  - Extend banks' storage capabilities to include **national and internal reports**.
  - Handle manual **data corrections** efficiently to ensure data integrity.
  - Deploy the solution in **the banks' preferred IT environment**, be it cloud-based or on-premises.
  - Utilize GenAI to accurately **identify essential data** within source databases.

PwC solution architecture



Solution description

If banks have **enterprise data warehouse** storing the granular data in a common banking model, it is the right source for Risk/Fin common reporting layer.

If it is not the case, PwC can help to create a data warehouse just for the data needed for Risk/Fin reporting.

Exceptionally, some data sources can be loaded directly into Risk/Fin common reporting layer.

The core of the solution is **Risk/Fin common reporting layer**. It is based on **BIRD** data model enriched by PwC to cover the data needed for all the reporting. **Data quality controls** are implemented. The reporting layer is equipped with **Corrections** application enabling to propose and to approve corrections in the data and to track them for an audit purpose. The corrections on the common data are realized just once and therefore the same way for all the reports.

Individual **Risk and Fin data marts** for different reporting purposes are then derived from the common quality data.

The solution can be hosted on **MS Azure or Amazon AWS cloud** or implemented specifically in a local bank infrastructure.

PwC approach summary

Bank problem

Many bank teams are involved and significant effort spent to:

- Run database infrastructure
- Prepare source data for each report
- Clean it
- Make manual corrections
- Report it

Despite it, quality issues and mutual inconsistencies arise in the reports.

Our capabilites

PwC has at your disposal a team experienced in:

- EU regulatory reporting
- Local regulatory reporting
- Internal risk reporting
- Business data understanding
- Risk management and modelling
- Data architecture and delivery

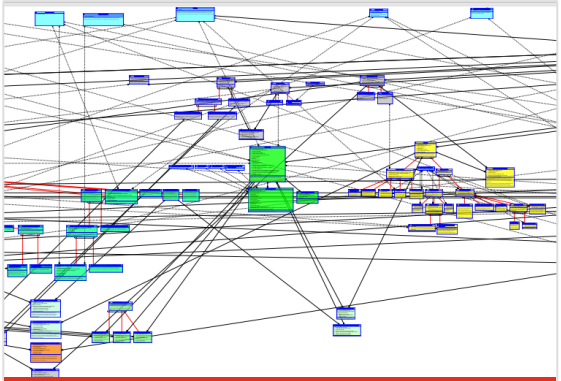
Our approach

Building a unique solution to cover the risk and finance reporting

- Anu EU compliant cloud platform infrastructure - MS Azure or Amazon AWS or a banks' own platform
- Unified data set for financial and risk internal and regulatory reporting - PwC data model extension of BIRD
- Automated data quality controls and their reporting
- Process and tools to make and document manual corrections
- Common reporting platform

This solution saves the effort spent on regulatory and internal reporting and improve the reporting quality and consistency.

Data model



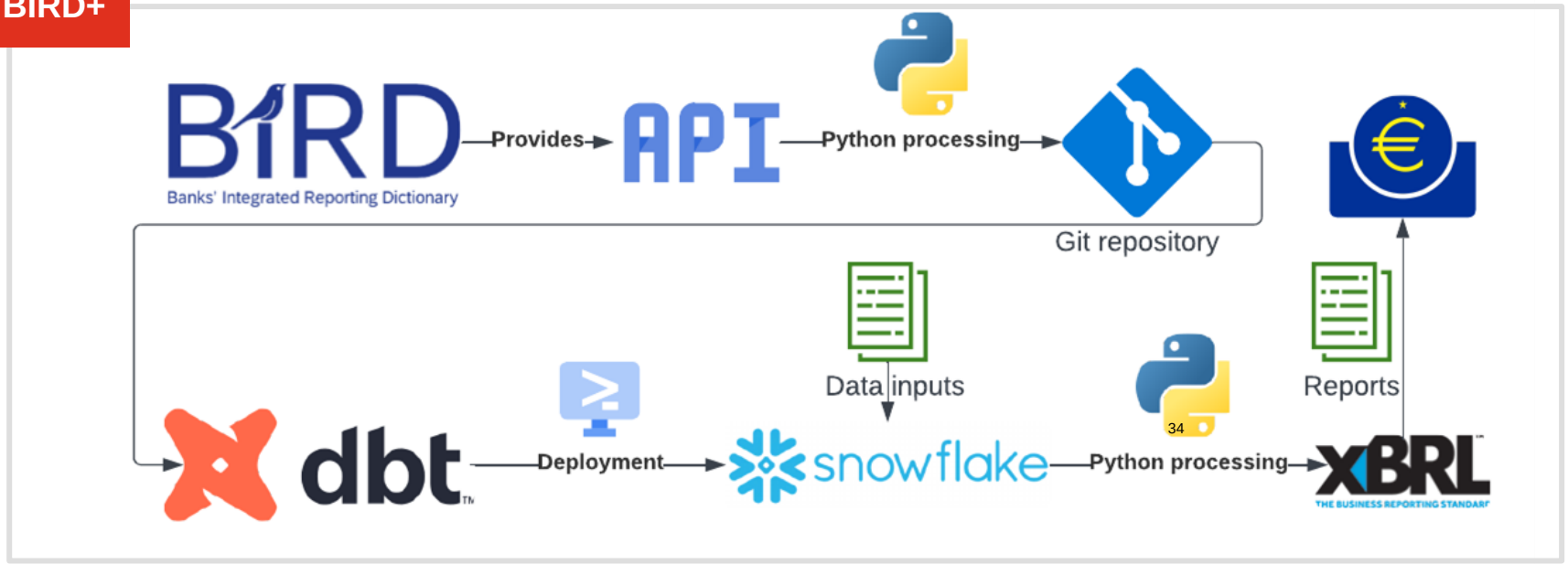
PwC data model extension of BIRD

Logical data model with the needed attributes of the main entities:

- Rating,
- Party,
- Instrument,
- Agreement,
- Credit Facility,
- Collateral,
- Security and Derivative,
- Securitisation,
- Non-financial asset and liability

BIRD+ proof of concept demonstration video

BIRD+



Benefits for Banks

Focus on data quality

BIRD provides the ability to improve **data quality** in regulatory reporting. With **harmonized data definitions and transformation rules**, BIRD provides a framework to focus on data quality.

Harmonized reporting process

Common understanding of **data definitions** across (cross-border) reporting frameworks and entities, leading to consistent reporting and less manual processing and more control in the reporting process.

Strategic Realignment

BIRD provides the ability to implement a **data-focused reporting** process, which will eventually benefit all other reporting frameworks and improve regulatory compliance due to improved data management.

Efficient implementation

Implementing BIRD, especially with IReF, **reduces the reporting workload** for banks. They provide an **efficient data model and simplify reporting requirements**, making the reporting process more efficient and supporting the **free choice of the solution architecture**.

Proportionality

IReF applies the principle of proportionality, **tailoring reporting requirements** based on the size and complexity of each institution. Smaller banks are not burdened with excessive reporting obligation.

8

Where Banks Should Start

Where Banks should start

Reminders:

- In January 2027, statistical reporting will significantly change for the banks in Eurozone
- ECB BIRD supports the data preparation for all kind of regulatory reporting

To do:

- ☐ Familiarize yourself with the deliverables of IReF, BIRD, DPM and JBRC
- ☐ Identify the weaknesses of your regulatory and internal reporting
- ☐ Define the vision of your regulatory and internal reporting
- ☐ Make a gap analysis between your current and the desired state
- ☐ Prepare and make the necessary decisions about future data processing and supporting technology
- ☐ Create a roadmap of regulatory and internal reporting in terms of organization, processes, data and technology

PwC is ready to support you in this journey!

Interested?
Contact us.

Petr Novák

Data Delivery,
Risk Management and Modeling

PwC Czech Republic

T: +420 602 383 972
M: petr.novak@pwc.com

Platón Karabínoš

Data Architecture,
Risk Management and Modeling

PwC Czech Republic

T: +420 773 792 817
M: platon.karabinos@pwc.com

Thank you

PwC Czech Republic
Risk Management & Modelling

www.pwc.cz/rmm

© 2024 PricewaterhouseCoopers Česká republika, s.r.o. All rights reserved. “PwC” is the brand under which member firms of PricewaterhouseCoopers International Limited (PwCIL) operate and provide services. Together, these firms form the PwC network. Each firm in the network is a separate legal entity and does not act as agent of PwCIL or any other member firm. PwCIL does not provide any services to clients. PwCIL is not responsible or liable for the acts or omissions of any of its member firms nor can it control the exercise of their professional judgment or bind them in any way.