

MOODY'S
ANALYTICS

AXIS™

*Better
Faster
Decisions*

Introduction to Multiple Data Models

December 2020

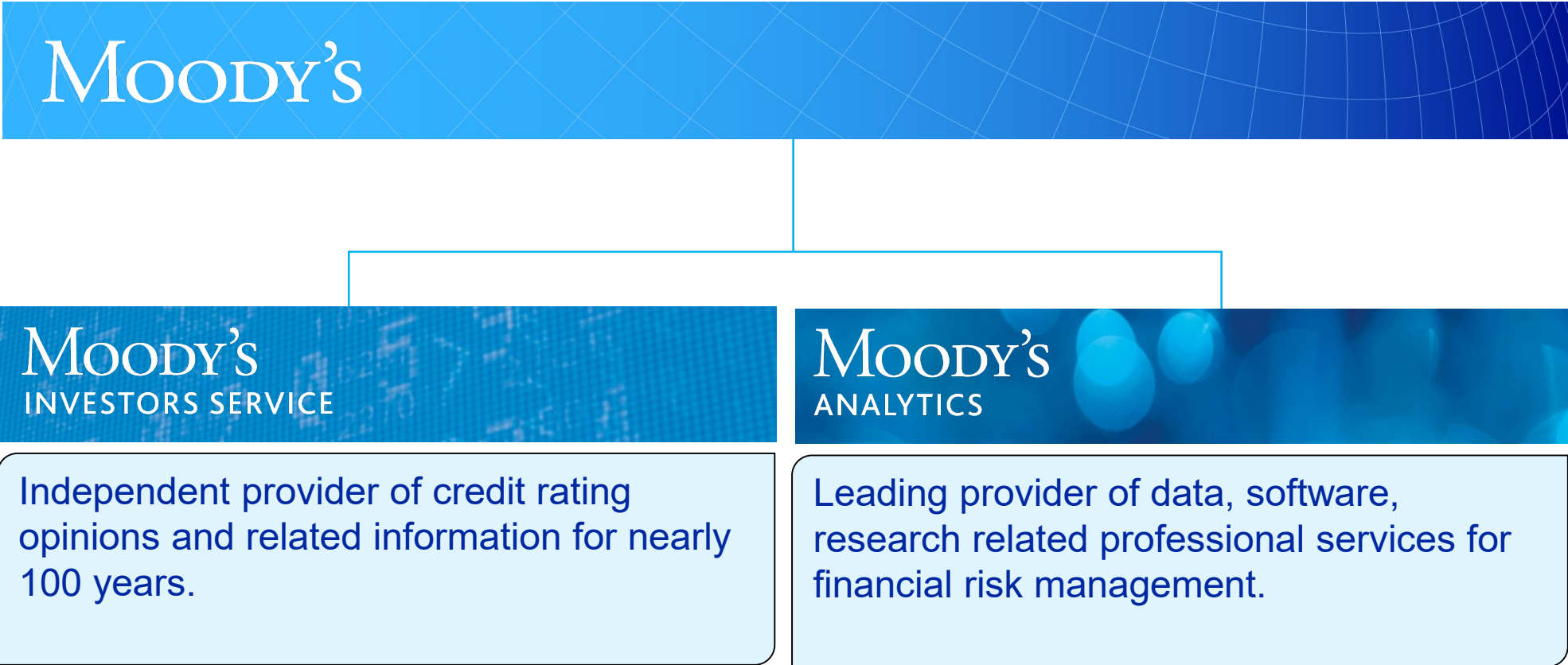
Disclaimer



Information regarding products, features, specifications and functionality in Moody's Analytics product roadmaps is intended to outline Moody's Analytics general product direction but is not guaranteed. Future products will be sold only when and if available. Moody's Analytics reserves our right to change the development, release, and timing of features and functionality discussed in our product roadmap at anytime.

© 2020 Moody's Analytics, Inc. – DO NOT DISTRIBUTE

Moody's Analytics helps our global clients measure, understand and mitigate risk – beyond ratings



Preamble

- » Please submit questions to the Webinar team using the question box in the Webinar window lower right corner
 - Time permitting we will address selected questions at the end of the webcast.
 - Following the webcast we will respond to all questions either directly or by posting additional FAQ pages to our website.
- » We will make this webinar's recording available to all registered participants following the webcast.

Today's Presenters

Moderator: **Trevor Howes** FSA, MAAA, FCIA
Director, Actuary

Speakers: **Matt Nezwek** FSA, MAAA
Associate Director, Client Support Actuary

Agenda

1. Introduction
2. Data Models
3. AXIS System Data Methodologies
4. Use Cases – Model Build
5. Use Cases – Results
6. Other Topics
7. Q&A
8. Conclusion and Wrap-up

1

Introduction

Introduction to Multiple Data Models

- » Data Models
 - Collection of seriatim records
- » You can manage multiple Data Models in a single AXIS Dataset
 - Supported by the DataLink module
- » Additional areas in AXIS system utilize Multiple Data Models

Compression

- Run Time

IFRS 17 Link

- FCF Movement

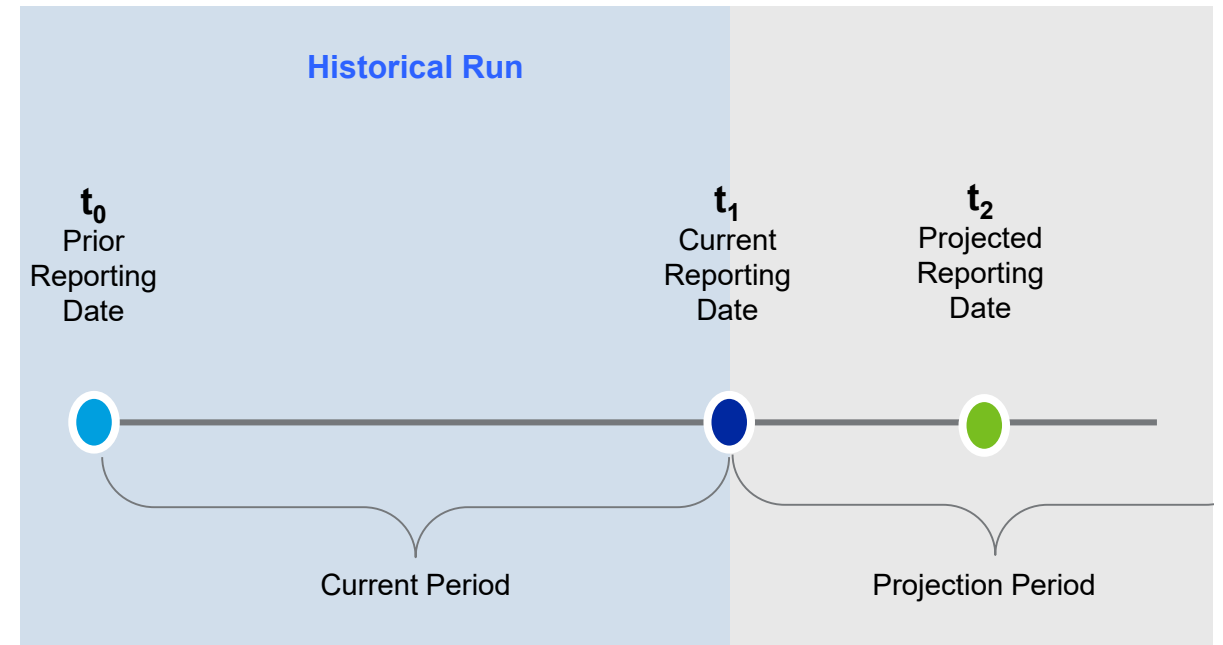
US GAAP
Link

- Disclosures

Introduction to Multiple Data Models

The Need for Multiple Data Models

- » US GAAP Link
 - US GAAP Current Reporting Period Batch
- » IFRS 17 Link
 - IFRS 17 Current Reporting Period Batch
- » These batches can automatically pick up and process multiple data models
 - Module Licenses are required



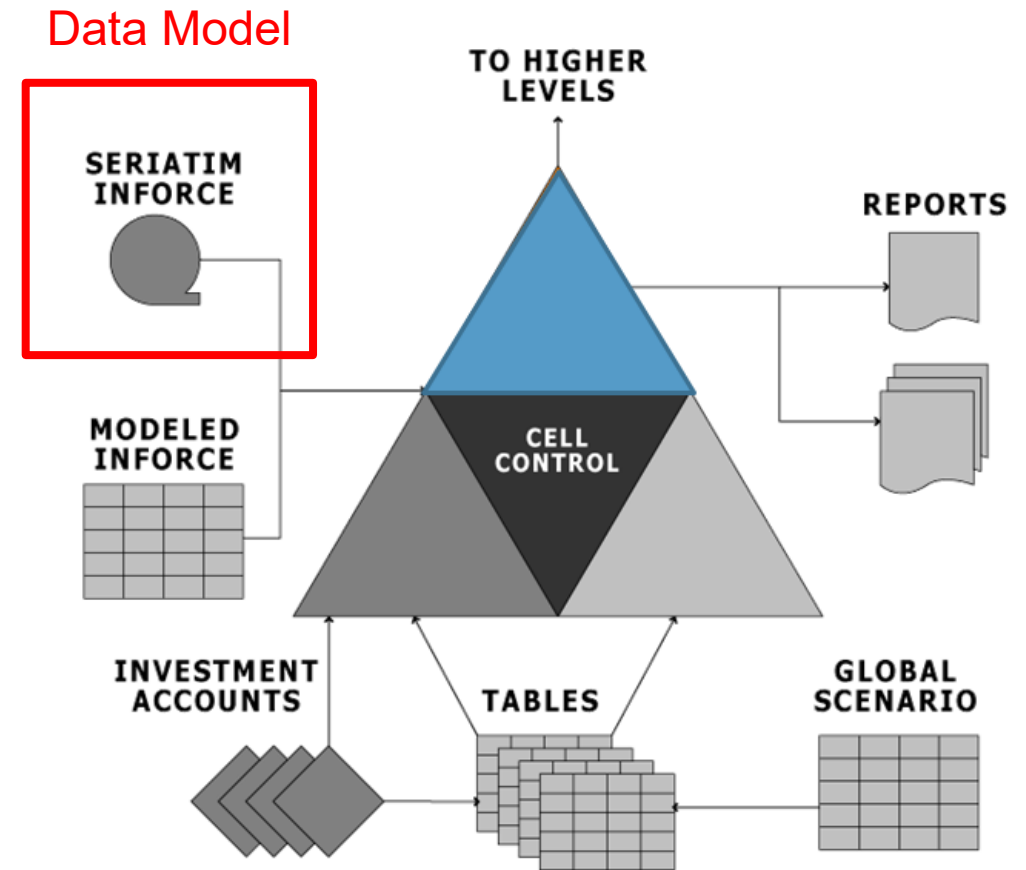
2

Data Models

Data Models

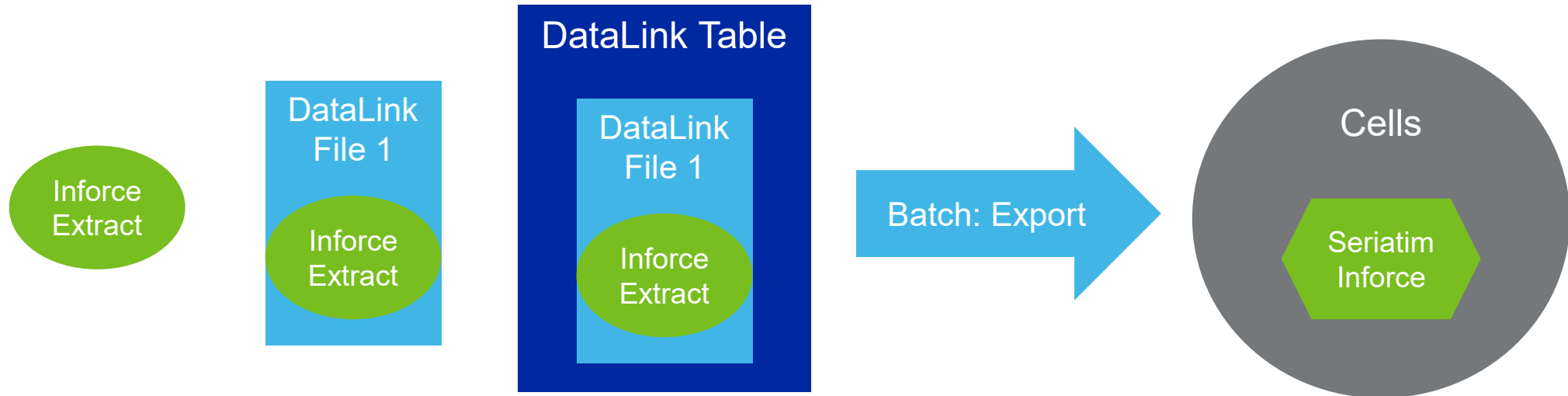
What is a Data Model?

- » Valuation work requires Seriatim Valuation
- » A Data Model represents an inforce extract
- » Multiple Data Models can represent multiple versions of inforce extracts
- » A single dataset can hold multiple Data Models
- » Data Models can have different inforce dates



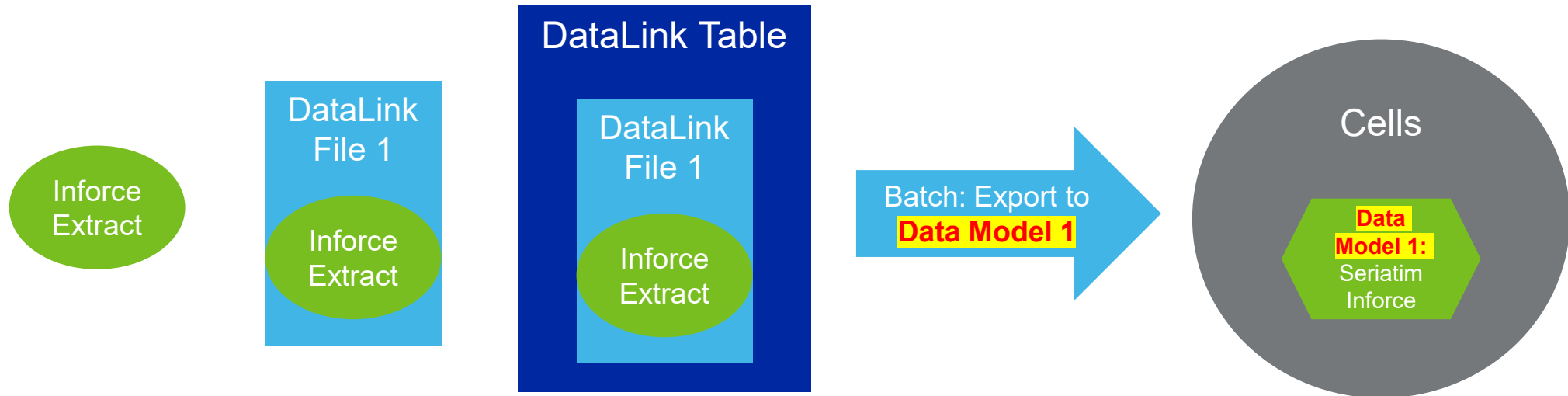
Data Models

How do Data Models fit into the AXIS system?



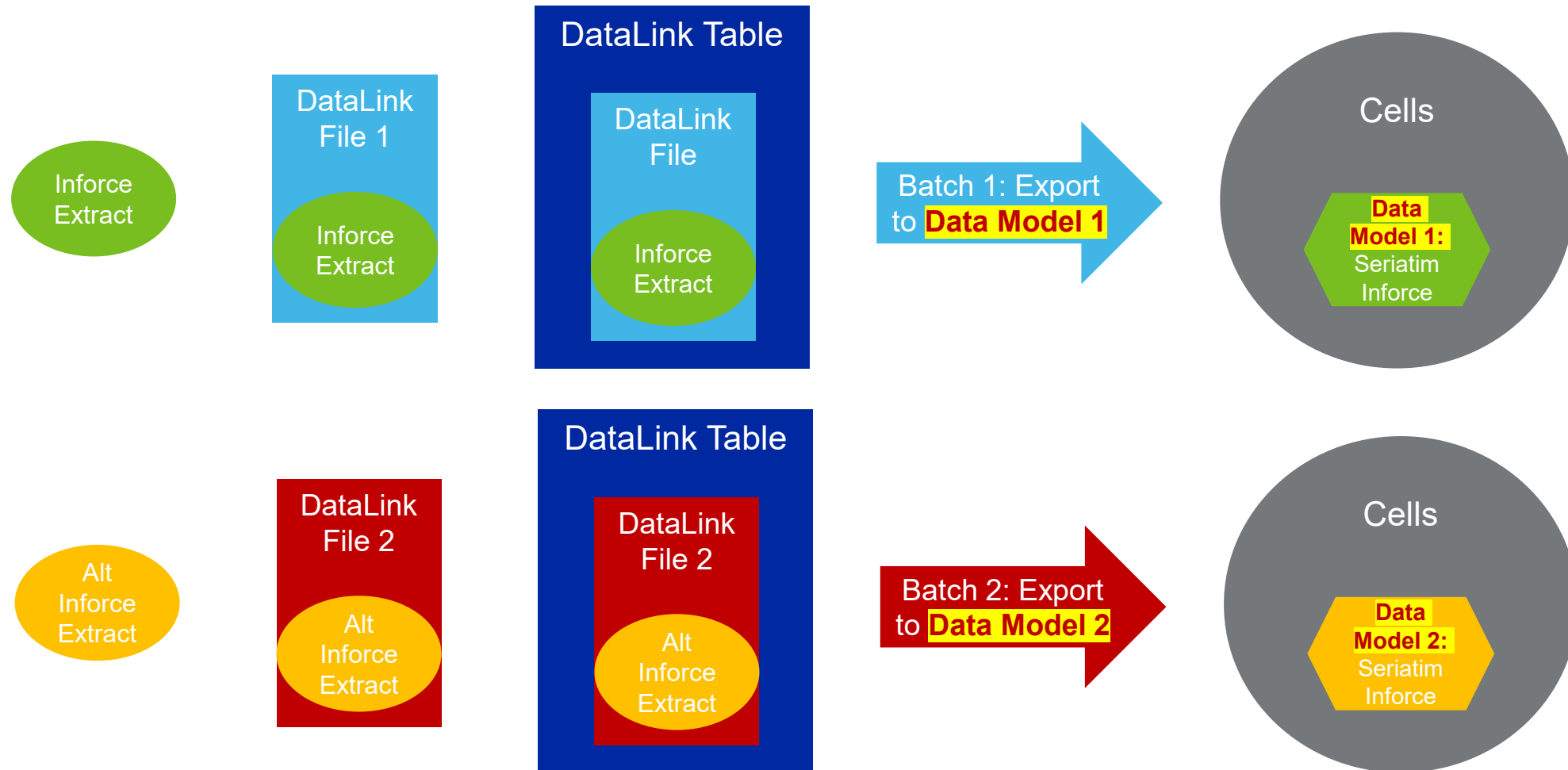
Data Models

How do Data Models fit into the AXIS system?



Data Models

How do Data Models fit into the AXIS system?

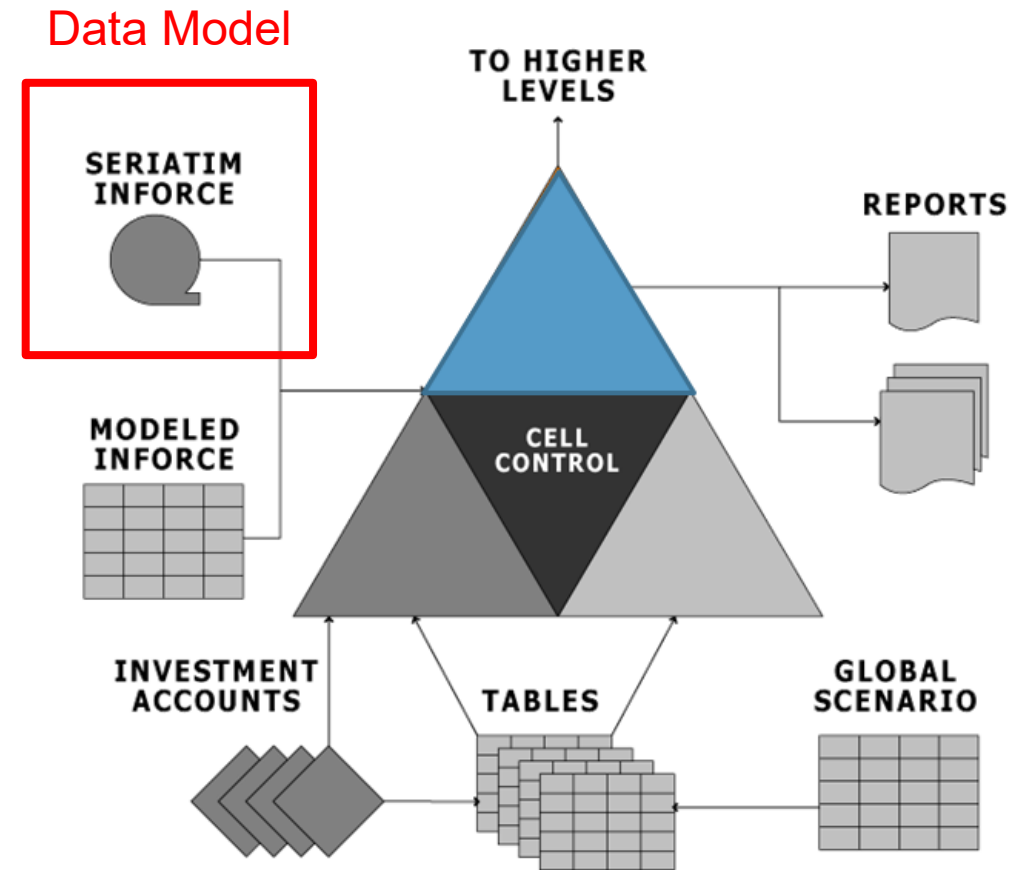


AXIS System Demo

Data Models

Key Takeaways

- » A Data Model represents an instance of an inforce extract
- » DataLink objects can be reused for creating multiple Data Models
- » Other tables and objects in the dataset are unaffected by Data Models



3

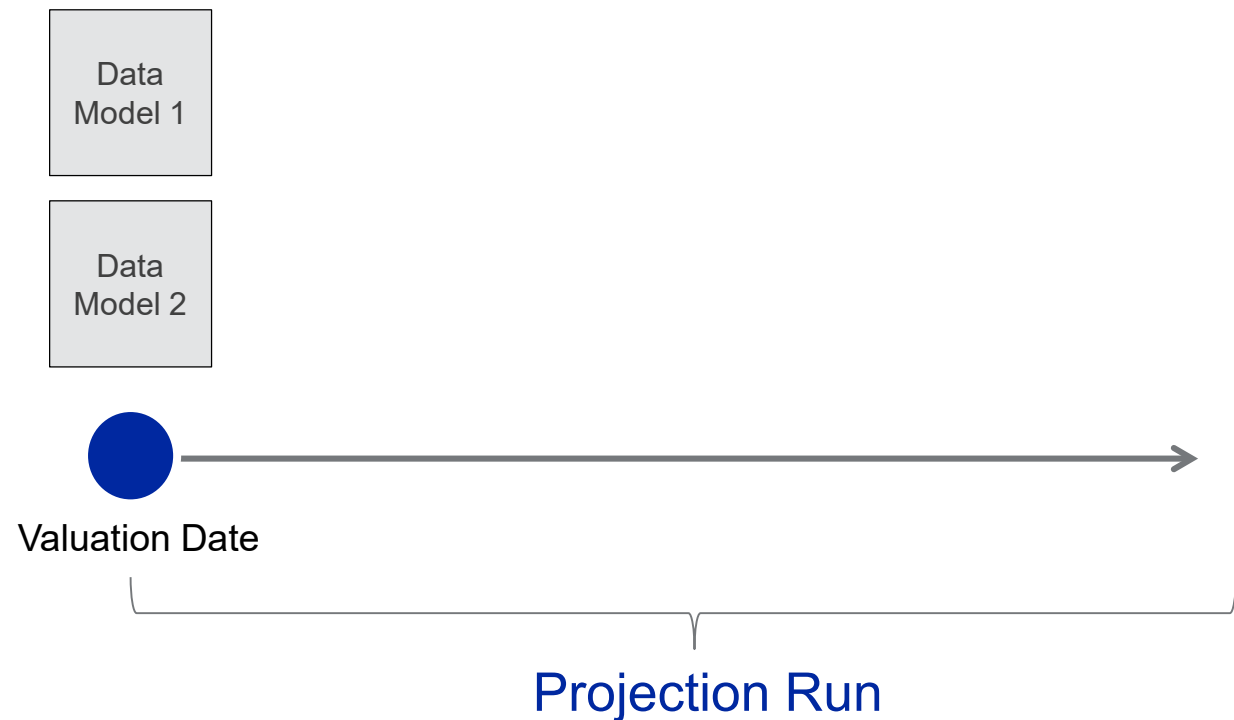
AXIS System Data Methodologies

AXIS System Data Methodologies

Introduction

» Projection Run

- Inforce Date = Valuation Date

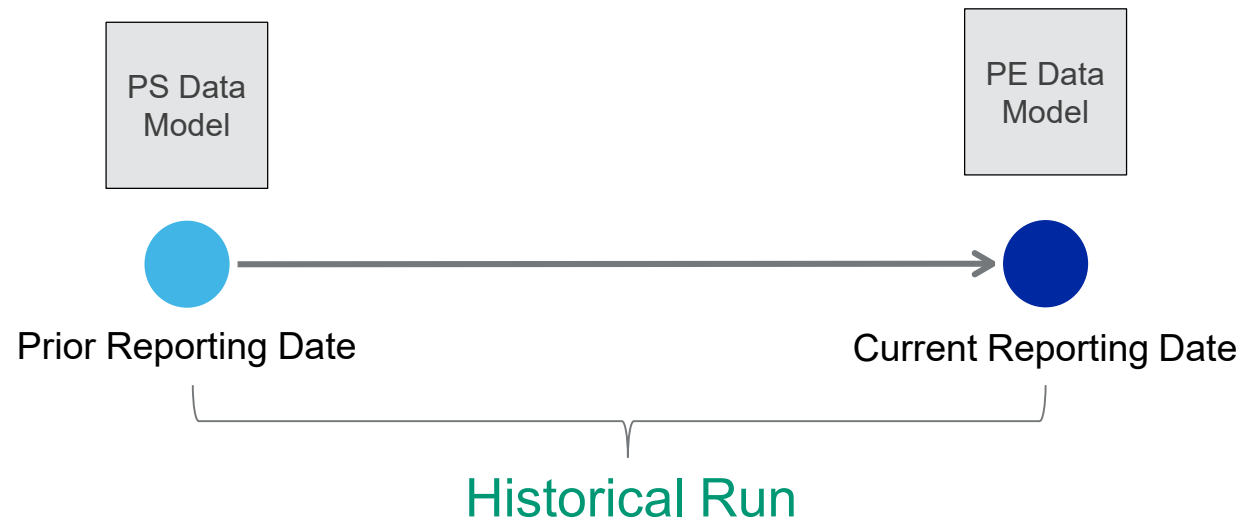


AXIS System Data Methodologies

Introduction

» Historical Run

- License Required (US GAAP Link, IFRS 17 Link, Earnings by Source)
- Current Reporting Date = Valuation Date
- Can provide Transaction data to describe behavior between dates

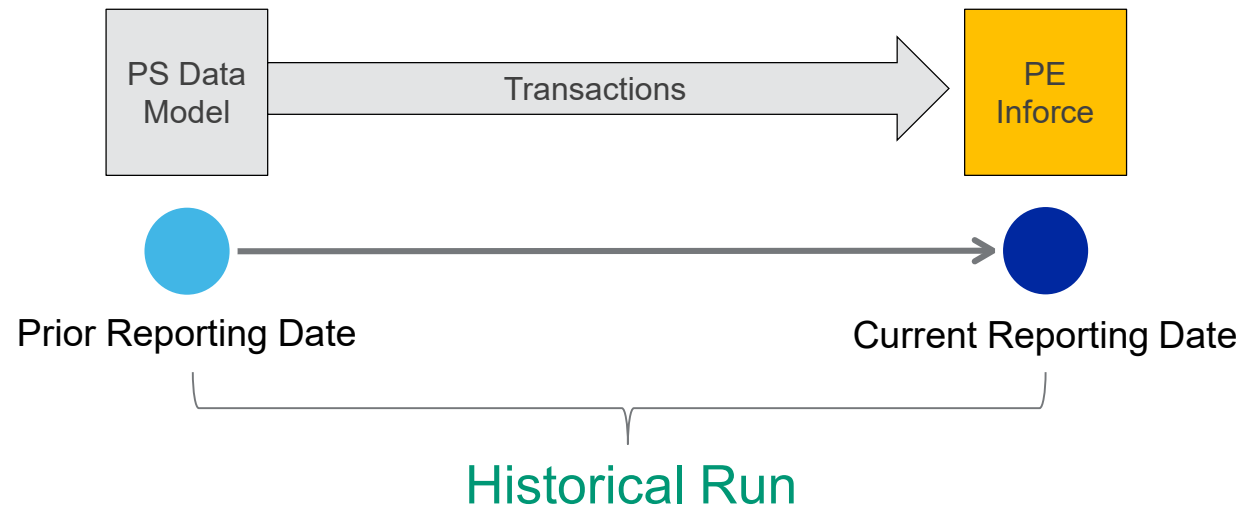


AXIS System Data Methodologies

Introduction

» Transactions

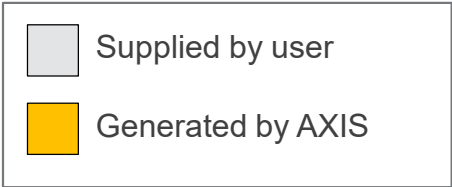
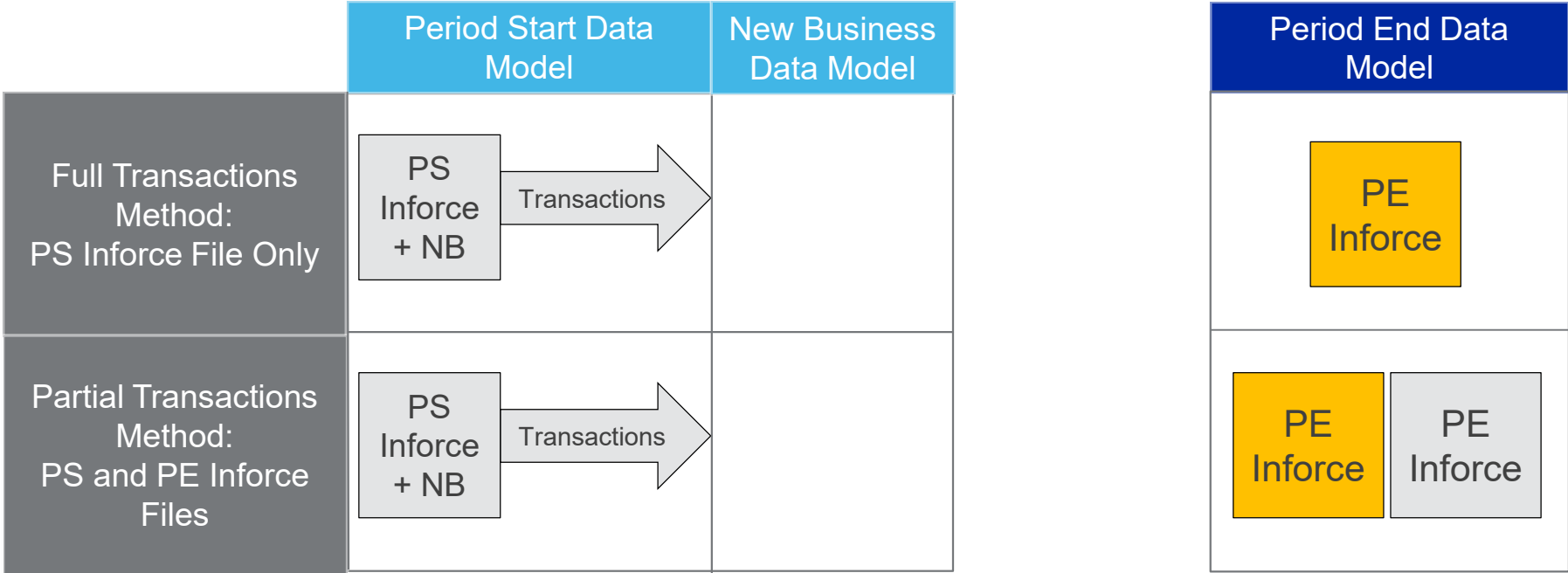
- Supplementary information included with PS Data Model



Policy Movement	Fund Movement	Future Values
<ul style="list-style-type: none">• Death• Lapse• Annuitization• New Issue	<ul style="list-style-type: none">• Premium• Withdrawal	<ul style="list-style-type: none">• Account Value• Guarantee Balance

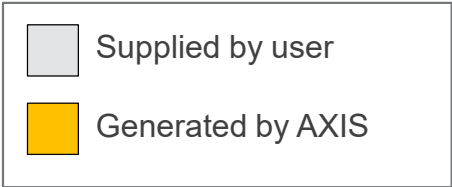
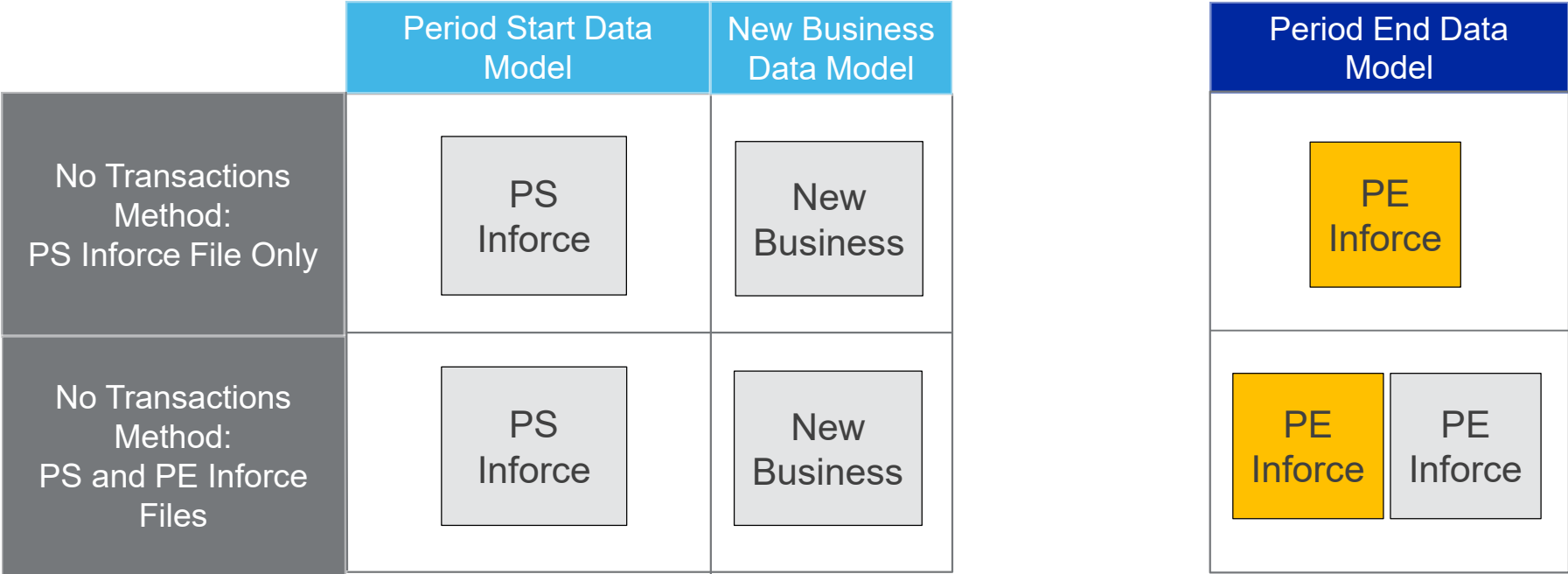
AXIS System Data Methodologies

Transaction Data is Available



AXIS System Data Methodologies

No Transaction Data



AXIS System Data Methodologies

Where to Start?

What's the context of the run?

- IFRS 17 vs US GAAP TI

What data is available?

- Transactional records (Policy event information)
- Period end inforce extract

4

Use Case – Model Build

Use Case – Model Build

Background

Regular Life Module

- Period Start Data Model
- Period End Data Model

US GAAP Link

- Partial Transactions Method: PS and PE Inforce Files

AXIS System Demo

Use Case – Model Build

Key Takeaways

- » DataLink Files point to different inforce extracts
 - Ensure their status dates make sense
- » DataLink tables can be reused for different Data models
 - Some tables must be reused
- » DataLink table options are important to review when using Transactions
- » “Update DataLink Table Options” action is permanent
- » Only a single Data Model can be created within a single batch
- » Switching between Data Models is done via Tools -> Inforce Seriatim -> Set Active Data Model

5

Use Case – Results

Use Case – Results

Putting Data Methodologies into Effect

- » Before running a Current Reporting batch, be careful to define what data to use
- » Dataset Parameters -> Historical Data -> Data model definition
 - These definitions tie back to the charts
- » Once a definition is set, Data Models must be specified for the corresponding points in time

Data model definition

Use period start + transactions and period end models

Period start inforce + transactions: PS Trans

Period start inforce:

New business:

Period end inforce: PE

AXIS System Demo

Use Case – Results

Key Takeaways

- » Define the Data methodologies and data models up front
 - Set in the Historical Data tab in Dataset Parameters
- » Current Reporting batches incorporate multiple data models based on data supplied (US GAAP Link or IFRS 17 Link license required)

» Historical Run Results:

Batch Results
<ul style="list-style-type: none">• Cohort / Group• Seriatim:<ul style="list-style-type: none">• One report for each Data Model

Interactive Cell Results
<ul style="list-style-type: none">• Output based on:<ul style="list-style-type: none">• Active Data Model• Data Definition

Interactive Subfund Results
<ul style="list-style-type: none">• None

6

Other Topics

Transferring / Backing Up Data

- » When transferring data, can elect to:
 - Transfer data associated with just the active data model
 - Transfer data associated with all data models

- » When backing up data, all data models will be included

The screenshot shows the 'Transfer Options' dialog box with the following settings:

- Select option:**
 - Overwrite all duplicates of all objects with source data
 - Do not overwrite duplicates of any objects
 - Ask before overwriting every object
- Daily hedge scenarios are compared based on date and all other objects are compared based on name.
- Transfer all Daily Historical Scenarios in the dataset
- Serialim Transfer (highlighted):**
 - Transfer serialim data attached to cells
 - Transfer active data model to target active data model
 - Transfer all data models to their respective data models in target
- DataLink tables data: Transfer for mapping rules tables only
- Display transfer details when done
- Prefix all object names: []
- (Prefix is not added to Scenario Market, Greeks Report, Daily Historic Scenario, Intraday Daily Hedge Scenario, Credit Rating and Rating Scale)
- Back up target dataset before transfer

Buttons: Help, Transfer, Cancel

Resources

Where to go to find more information

- » DataLink for Historical Period User Guide: KB 2256
 - <https://www.ggy.com/kb/article/2256>
 - General User Guide covering building Data Models for Link runs (and EBS)
- » Modeling IFRS 17 in AXIS User Guide: KB 2133
 - <https://www.ggy.com/kb/article/2133>
 - Dataset example for IFRS 17 Link run with different Data Methodologies
- » US GAAP ASU 2018-12 Sample Datasets: KB 2294
 - <https://www.ggy.com/kb/article/2294>
 - Dataset example for US GAAP Link run with different Data Methodologies

7

Q & A

8

Conclusion & Wrap-up

Thank You

Trevor Howes
Trevor.Howes@moodys.com

Matt Nezwek
Matthew.Nezwek@moodys.com

© 2020 Moody's Corporation, Moody's Investors Service, Inc., Moody's Analytics, Inc. and/or their licensors and affiliates (collectively, "MOODY'S"). All rights reserved.

CREDIT RATINGS ISSUED BY MOODY'S INVESTORS SERVICE, INC. AND/OR ITS CREDIT RATINGS AFFILIATES ARE MOODY'S CURRENT OPINIONS OF THE RELATIVE FUTURE CREDIT RISK OF ENTITIES, CREDIT COMMITMENTS, OR DEBT OR DEBT-LIKE SECURITIES, AND MATERIALS, PRODUCTS, SERVICES AND INFORMATION PUBLISHED BY MOODY'S (COLLECTIVELY, "PUBLICATIONS") MAY INCLUDE SUCH CURRENT OPINIONS. MOODY'S INVESTORS SERVICE DEFINES CREDIT RISK AS THE RISK THAT AN ENTITY MAY NOT MEET ITS CONTRACTUAL FINANCIAL OBLIGATIONS AS THEY COME DUE AND ANY ESTIMATED FINANCIAL LOSS IN THE EVENT OF DEFAULT OR IMPAIRMENT. SEE MOODY'S RATING SYMBOLS AND DEFINITIONS PUBLICATION FOR INFORMATION ON THE TYPES OF CONTRACTUAL FINANCIAL OBLIGATIONS ADDRESSED BY MOODY'S INVESTORS SERVICE CREDIT RATINGS. CREDIT RATINGS DO NOT ADDRESS ANY OTHER RISK, INCLUDING BUT NOT LIMITED TO: LIQUIDITY RISK, MARKET VALUE RISK, OR PRICE VOLATILITY. CREDIT RATINGS, NON-CREDIT ASSESSMENTS ("ASSESSMENTS"), AND OTHER OPINIONS INCLUDED IN MOODY'S PUBLICATIONS ARE NOT STATEMENTS OF CURRENT OR HISTORICAL FACT. MOODY'S PUBLICATIONS MAY ALSO INCLUDE QUANTITATIVE MODEL-BASED ESTIMATES OF CREDIT RISK AND RELATED OPINIONS OR COMMENTARY PUBLISHED BY MOODY'S ANALYTICS, INC. AND/OR ITS AFFILIATES. MOODY'S CREDIT RATINGS, ASSESSMENTS, OTHER OPINIONS AND PUBLICATIONS DO NOT CONSTITUTE OR PROVIDE INVESTMENT OR FINANCIAL ADVICE, AND MOODY'S CREDIT RATINGS, ASSESSMENTS, OTHER OPINIONS AND PUBLICATIONS ARE NOT AND DO NOT PROVIDE RECOMMENDATIONS TO PURCHASE, SELL, OR HOLD PARTICULAR SECURITIES. MOODY'S CREDIT RATINGS, ASSESSMENTS, OTHER OPINIONS AND PUBLICATIONS DO NOT COMMENT ON THE SUITABILITY OF AN INVESTMENT FOR ANY PARTICULAR INVESTOR. MOODY'S ISSUES ITS CREDIT RATINGS, ASSESSMENTS AND OTHER OPINIONS AND PUBLISHES ITS PUBLICATIONS WITH THE EXPECTATION AND UNDERSTANDING THAT EACH INVESTOR WILL, WITH DUE CARE, MAKE ITS OWN STUDY AND EVALUATION OF EACH SECURITY THAT IS UNDER CONSIDERATION FOR PURCHASE, HOLDING, OR SALE.

MOODY'S CREDIT RATINGS, ASSESSMENTS, OTHER OPINIONS, AND PUBLICATIONS ARE NOT INTENDED FOR USE BY RETAIL INVESTORS AND IT WOULD BE RECKLESS AND INAPPROPRIATE FOR RETAIL INVESTORS TO USE MOODY'S CREDIT RATINGS, ASSESSMENTS, OTHER OPINIONS OR PUBLICATIONS WHEN MAKING AN INVESTMENT DECISION. IF IN DOUBT YOU SHOULD CONTACT YOUR FINANCIAL OR OTHER PROFESSIONAL ADVISER.

ALL INFORMATION CONTAINED HEREIN IS PROTECTED BY LAW, INCLUDING BUT NOT LIMITED TO, COPYRIGHT LAW, AND NONE OF SUCH INFORMATION MAY BE COPIED OR OTHERWISE REPRODUCED, REPACKAGED, FURTHER TRANSMITTED, TRANSFERRED, DISSEMINATED, REDISTRIBUTED OR RESOLD, OR STORED FOR SUBSEQUENT USE FOR ANY SUCH PURPOSE, IN WHOLE OR IN PART, IN ANY FORM OR MANNER OR BY ANY MEANS WHATSOEVER, BY ANY PERSON WITHOUT MOODY'S PRIOR WRITTEN CONSENT.

MOODY'S CREDIT RATINGS, ASSESSMENTS, OTHER OPINIONS AND PUBLICATIONS ARE NOT INTENDED FOR USE BY ANY PERSON AS A BENCHMARK AS THAT TERM IS DEFINED FOR REGULATORY PURPOSES AND MUST NOT BE USED IN ANY WAY THAT COULD RESULT IN THEM BEING CONSIDERED A BENCHMARK.

All information contained herein is obtained by MOODY'S from sources believed by it to be accurate and reliable. Because of the possibility of human or mechanical error as well as other factors, however, all information contained herein is provided "AS IS" without warranty of any kind. MOODY'S adopts all necessary measures so that the information it uses in assigning a credit rating is of sufficient quality and from sources MOODY'S considers to be reliable including, when appropriate, independent third-party sources. However, MOODY'S is not an auditor and cannot in every instance independently verify or validate information received in the rating process or in preparing its Publications.

To the extent permitted by law, MOODY'S and its directors, officers, employees, agents, representatives, licensors and suppliers disclaim liability to any person or entity for any indirect, special, consequential, or incidental losses or damages whatsoever arising from or in connection with the information contained herein or the use of or inability to use any such information, even if MOODY'S or any of its directors, officers, employees, agents, representatives, licensors or suppliers is advised in advance of the possibility of such losses or damages, including but not limited to: (a) any loss of present or prospective profits or (b) any loss or damage arising where the relevant financial instrument is not the subject of a particular credit rating assigned by MOODY'S.

To the extent permitted by law, MOODY'S and its directors, officers, employees, agents, representatives, licensors and suppliers disclaim liability for any direct or compensatory losses or damages caused to any person or entity, including but not limited to by any negligence (but excluding fraud, willful misconduct or any other type of liability that, for the avoidance of doubt, by law cannot be excluded) on the part of, or any contingency within or beyond the control of, MOODY'S or any of its directors, officers, employees, agents, representatives, licensors or suppliers, arising from or in connection with the information contained herein or the use of or inability to use any such information.

NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE ACCURACY, TIMELINESS, COMPLETENESS, MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OF ANY CREDIT RATING, ASSESSMENT, OTHER OPINION OR INFORMATION IS GIVEN OR MADE BY MOODY'S IN ANY FORM OR MANNER WHATSOEVER.

Moody's Investors Service, Inc., a wholly-owned credit rating agency subsidiary of Moody's Corporation ("MCO"), hereby discloses that most issuers of debt securities (including corporate and municipal bonds, debentures, notes and commercial paper) and preferred stock rated by Moody's Investors Service, Inc. have, prior to assignment of any credit rating, agreed to pay to Moody's Investors Service, Inc. for credit ratings opinions and services rendered by it fees ranging from \$1,000 to approximately \$2,700,000. MCO and Moody's investors Service also maintain policies and procedures to address the independence of Moody's Investors Service credit ratings and credit rating processes. Information regarding certain affiliations that may exist between directors of MCO and rated entities, and between entities who hold credit ratings from Moody's Investors Service and have also publicly reported to the SEC an ownership interest in MCO of more than 5%, is posted annually at www.moodys.com under the heading "Investor Relations — Corporate Governance — Director and Shareholder Affiliation Policy."

Additional terms for Australia only: Any publication into Australia of this document is pursuant to the Australian Financial Services License of MOODY'S affiliate, Moody's Investors Service Pty Limited ABN 61 003 399 657AFSL 336969 and/or Moody's Analytics Australia Pty Ltd ABN 94 105 136 972 AFSL 383569 (as applicable). This document is intended to be provided only to "wholesale clients" within the meaning of section 761G of the Corporations Act 2001. By continuing to access this document from within Australia, you represent to MOODY'S that you are, or are accessing the document as a representative of, a "wholesale client" and that neither you nor the entity you represent will directly or indirectly disseminate this document or its contents to "retail clients" within the meaning of section 761G of the Corporations Act 2001. MOODY'S credit rating is an opinion as to the creditworthiness of a debt obligation of the issuer, not on the equity securities of the issuer or any form of security that is available to retail investors.

Additional terms for Japan only: Moody's Japan K.K. ("MJKK") is a wholly-owned credit rating agency subsidiary of Moody's Group Japan G.K., which is wholly-owned by Moody's Overseas Holdings Inc., a wholly-owned subsidiary of MCO. Moody's SF Japan K.K. ("MSFJ") is a wholly-owned credit rating agency subsidiary of MJKK. MSFJ is not a Nationally Recognized Statistical Rating Organization ("NRSRO"). Therefore, credit ratings assigned by MSFJ are Non-NRSRO Credit Ratings. Non-NRSRO Credit Ratings are assigned by an entity that is not a NRSRO and, consequently, the rated obligation will not qualify for certain types of treatment under U.S. laws. MJKK and MSFJ are credit rating agencies registered with the Japan Financial Services Agency and their registration numbers are FSA Commissioner (Ratings) No. 2 and 3 respectively.

MJKK or MSFJ (as applicable) hereby disclose that most issuers of debt securities (including corporate and municipal bonds, debentures, notes and commercial paper) and preferred stock rated by MJKK or MSFJ (as applicable) have, prior to assignment of any credit rating, agreed to pay to MJKK or MSFJ (as applicable) for credit ratings opinions and services rendered by it fees ranging from JPY125,000 to approximately JPY250,000,000.

MJKK and MSFJ also maintain policies and procedures to address Japanese regulatory requirements.