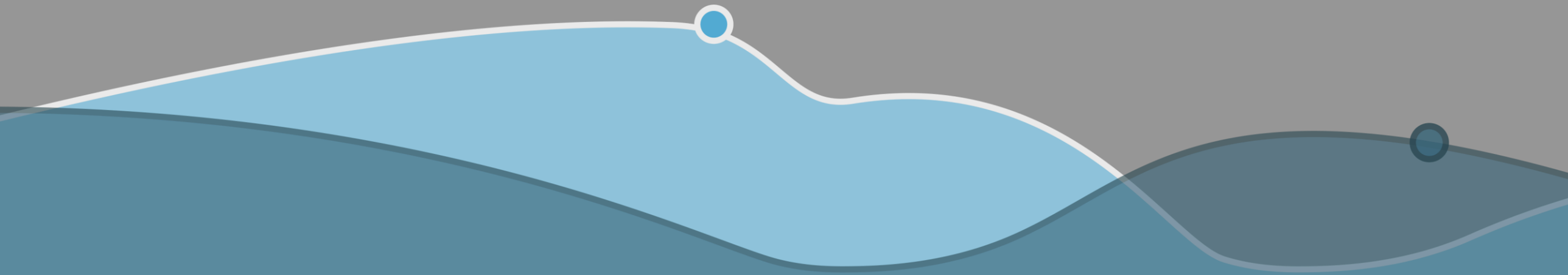
Microsoft

Cortana Analytics Workshop

Sept 10 – 11, 2015 • MSCC



Milliman, Integrate™

powered by Cortana Analytics

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Anand Subbaraj *- Program Manager, Microsoft*

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Agenda

- Session: Goals and Takeaways
- Introduction to Milliman
- Integrate: Overview
- Data Management: Overview
- Data Management: Demo
- Cortana Analytics: Technology Recap
- Q&A

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Goals & Takeaways

- **Goals:**
  - Introduction to Milliman and Integrate
  - Overview of how Milliman is using Azure and Cortana Analytics
  - Encourage you to Explore & Build solutions with Cortana Analytics

- **Takeaways:**
  - By building Integrate using Azure and Cortana Analytics:
    - Faster time-to-market
    - Reduced IT costs
    - Scalability on demand
    - More flexibility and creativity
    - Security and reliability
    - Transformative pricing model: pay-as-you-go

Who is Milliman?

- Milliman is a leading global provider of actuarial products & services. Founded in 1947, headquarters in Seattle.
- Milliman's Clients include:
  - Insurers and reinsurers
  - Financial service firms and investors
  - Technology companies
  - Law firms and accounting firms
  - Governments
  - Regulators and ratings bureaus
  - Professional and trade organizations

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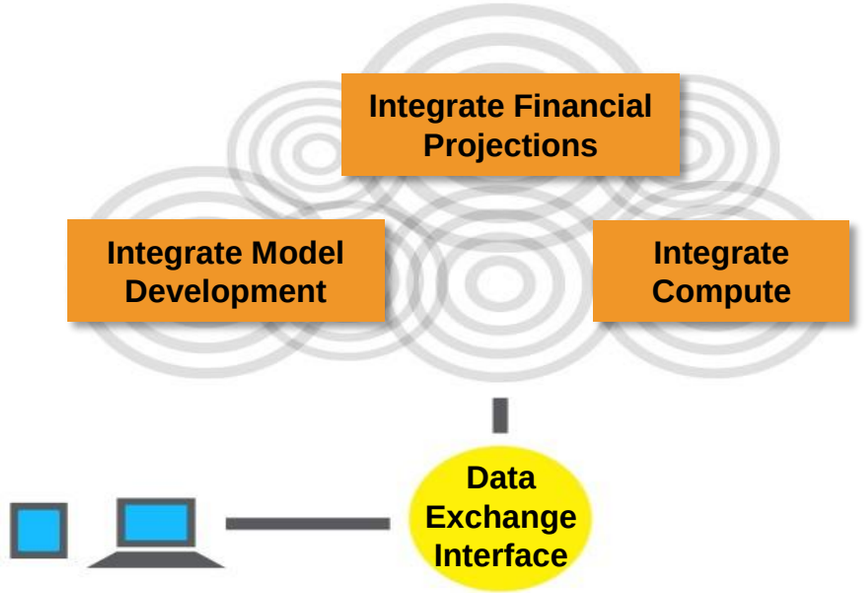
What is Integrate before Data Management

- An end-to-end, cloud-based solution, for the life insurance market
- Provides actuarial modeling at scale, using pay-as-you-go pricing model
- Powered by the Microsoft Azure Cloud

- **MG-ALFA:** Complete financial modeling system.
- **IC:** Grid Computing capabilities.
- **IMD:** Provides collaboration, control and tracking when working with models.
- **IFP**: Environment to work on financial projections.



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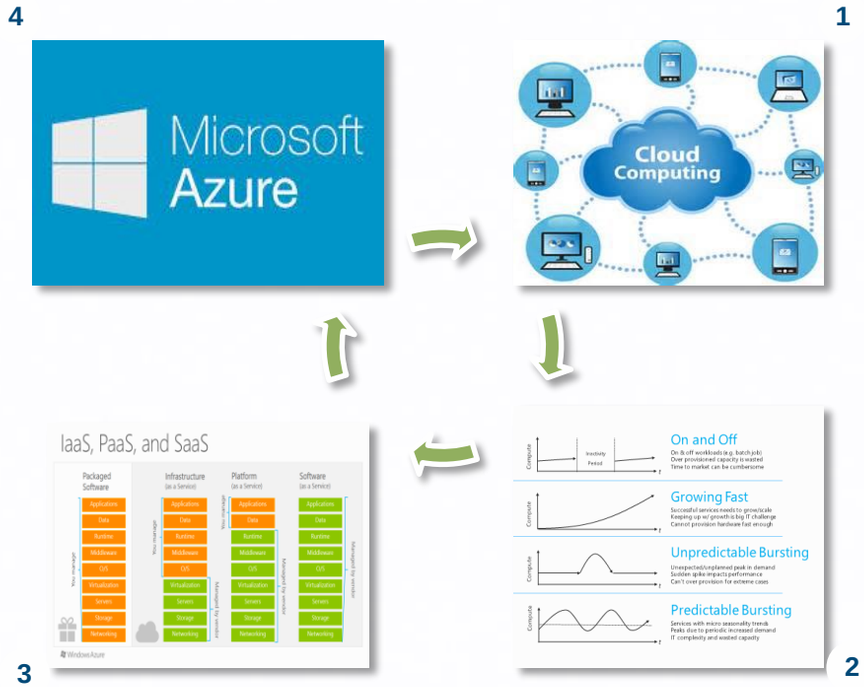
Moving to the Cloud – Why?

What was the problem…

- Changing market demands and needs
- Increasing cost and complexity of financial modeling
- Desire to free actuaries to focus their time and talents on analyzing results



1. *Decision to target cloud platform for future products*
2. *Reviewed workload requirements and cloud ability to deliver*
3. *Selected cloud delivery mechanism*
4. *Chose cloud provider*

** It was important that we were first to market**

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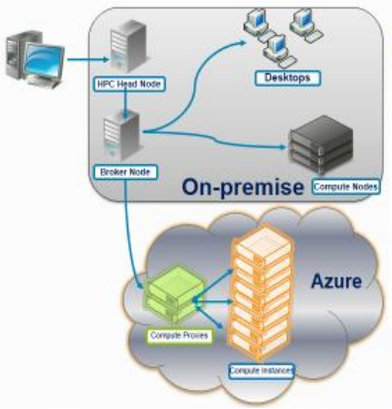
What about our On Premise Investment?

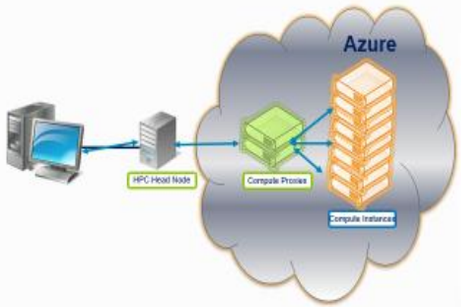
- **We could take advantage of both our existing on premise investment and leverage our new cloud investment….**

Windows HPC on Azure



- "Burst" into cloud on-demand while keeping control over data and corporate policies
- Pay only for what you use
- A stepping stone to hybrid and public clouds.
- Dynamically adjust how much runs on-premise and in the cloud

All in the Cloud



- Run HPC jobs without managing or maintaining a cluster
- Guaranteed SLAs
- Pay as you go, only for what you use
- Azure compute instances include both worker role and VM role

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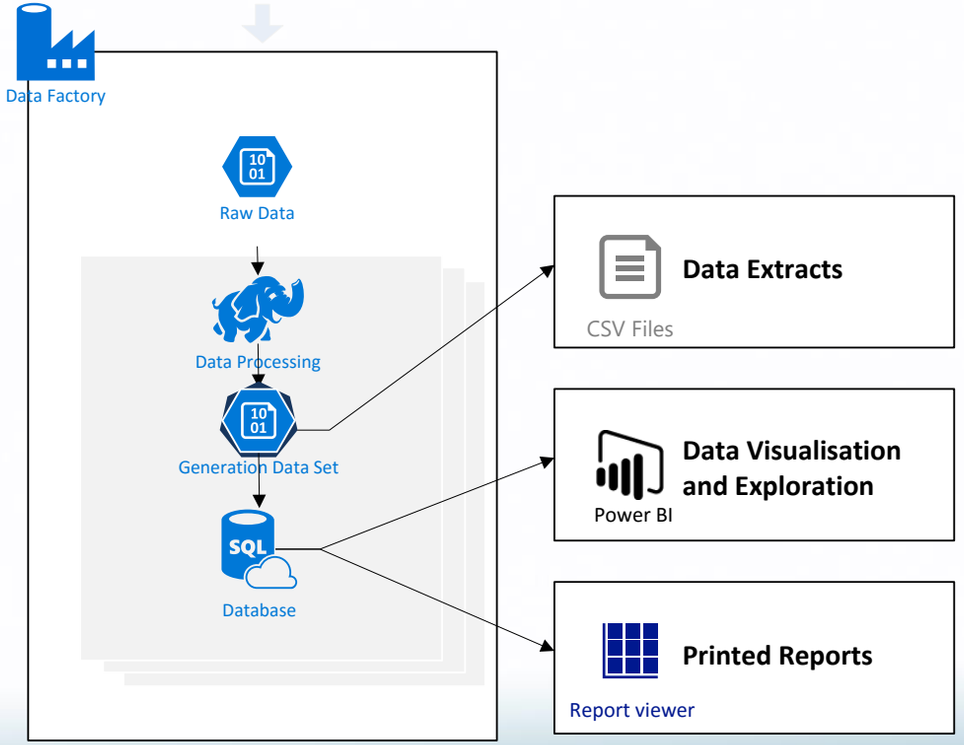
Integrate Talking Points…

- Running on Microsoft Azure
- Built using PaaS, delivered to Clients as SaaS solution
- Large scale compute demands
- Using Azure Storage
- Last year surpassed more than 45 million compute hours
- Run on grids as large as 50,000 cores
- 99.9% job completion ratio

What is Data Management?

- New Product under development, essential to support the financial reporting process
- Provides Extract Transform Load (ETL), Data Analytics and Reporting, powered by Cortana Analytics



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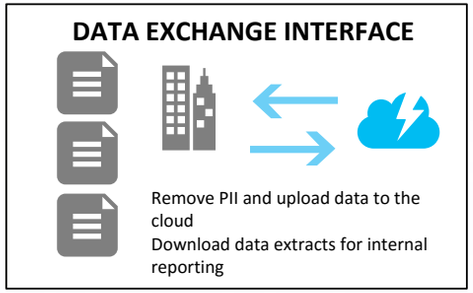
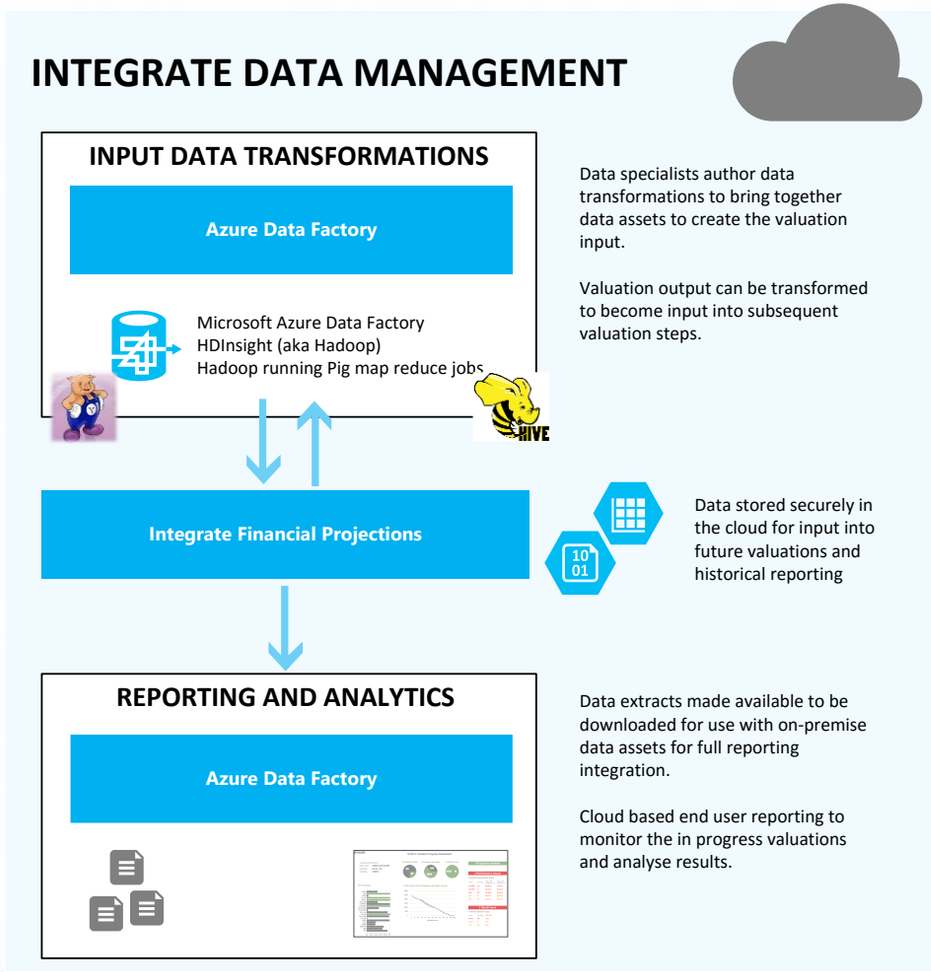
Data Management Talking Points…

- Already Built, ETL:
  - Azure Data Factory, to drive ETL process using pipelines
  - HDInsight, for Big Data processing, using Pig Scripts to analyze large data sets
  - Azure Storage
- Under Development, Reporting:
  - Power BI, for interactive dashboards and drill downs
  - SQL Server Reporting Services, for tabular reporting and printing

Data Management - Technical Overview





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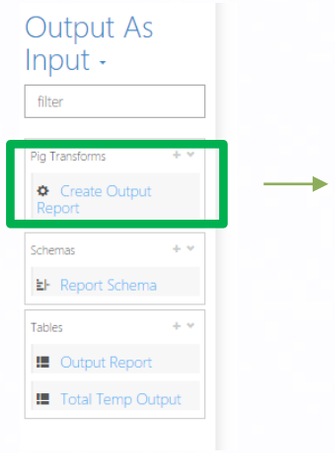
Pig Script Example



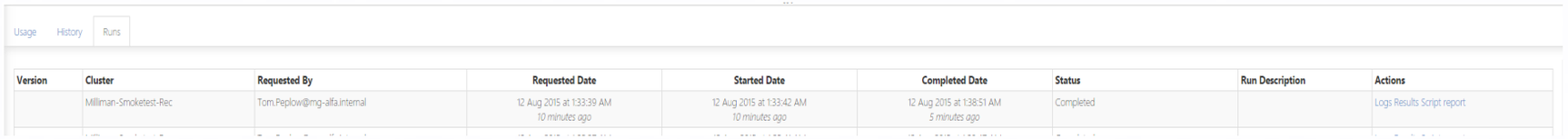

```
-- join to the IFP job metadata so we can get Fund and Job Step information
with_output_metadata = JOIN total_temp BY Idm_MetadataKey, total_temp_metadata BY Idm_MetadataKey;
-- join to the inputs used ot create the output so we can get out the scenario id used
total_temp_all_metadata_unfiltered = JOIN with_output_metadata BY total_temp::Idm_MetadataKey, total_temp_inputs BY Idm_MetadataKey;
-- filter out other inputs that are not scenario sets
total_temp_all_metadata = FILTER total_temp_all_metadata_unfiltered BY Sys_ScenarioSetId IS NOT NULL;

-- group by scenario id so we get scenario level data in our output report
grouped_by_scenario = GROUP total_temp_all_metadata BY (ScenId);

report = FOREACH grouped_by_scenario {

    -- pick out the variables we want from the sub total temp
    srAG43DiscFactor = FILTER total_temp_all_metadata BY VarName == 'srAG43DiscFactor';
    srAtaxDiscFactor = FILTER total_temp_all_metadata BY VarName == 'srAtaxDiscFactor';
    srNegSurplus = FILTER total_temp_all_metadata BY VarName == 'srNegSurplus';
    srNegWorstPVSurplus = FILTER total_temp_all_metadata BY VarName == 'srNegWorstPVSurplus';
    srPtaxDiscFactor = FILTER total_temp_all_metadata BY VarName == 'srPtaxDiscFactor';


    -- piviot the values from the total temp report into columns and include the metadata values (valuation date, fund, job step id, scnearion set id...)
    GENERATE
        FLATTEN (srAG43DiscFactor.(
            with_output_metadata::total_temp_metadata::Sys_ValuationDate,
            with_output_metadata::total_temp_metadata::Sys_Fund,
            with_output_metadata::total_temp_metadata::Sys_JobStepId,
            Sys_ScenarioSetId,
            ScenId,
            Last
        )) AS (ValuationDate, Fund, JobStep, ScnearioSetId, ScenarioNumber, srAG43DiscFactor),
        FLATTEN(srAtaxDiscFactor.Last) AS srAtaxDiscFactor,
        FLATTEN(srNegSurplus.Last) AS srNegSurplus,
        FLATTEN(srNegWorstPVSurplus.Last) AS srNegWorstPVSurplus,
        FLATTEN(srPtaxDiscFactor.Last) AS srPtaxDiscFactor
  ;
}
```



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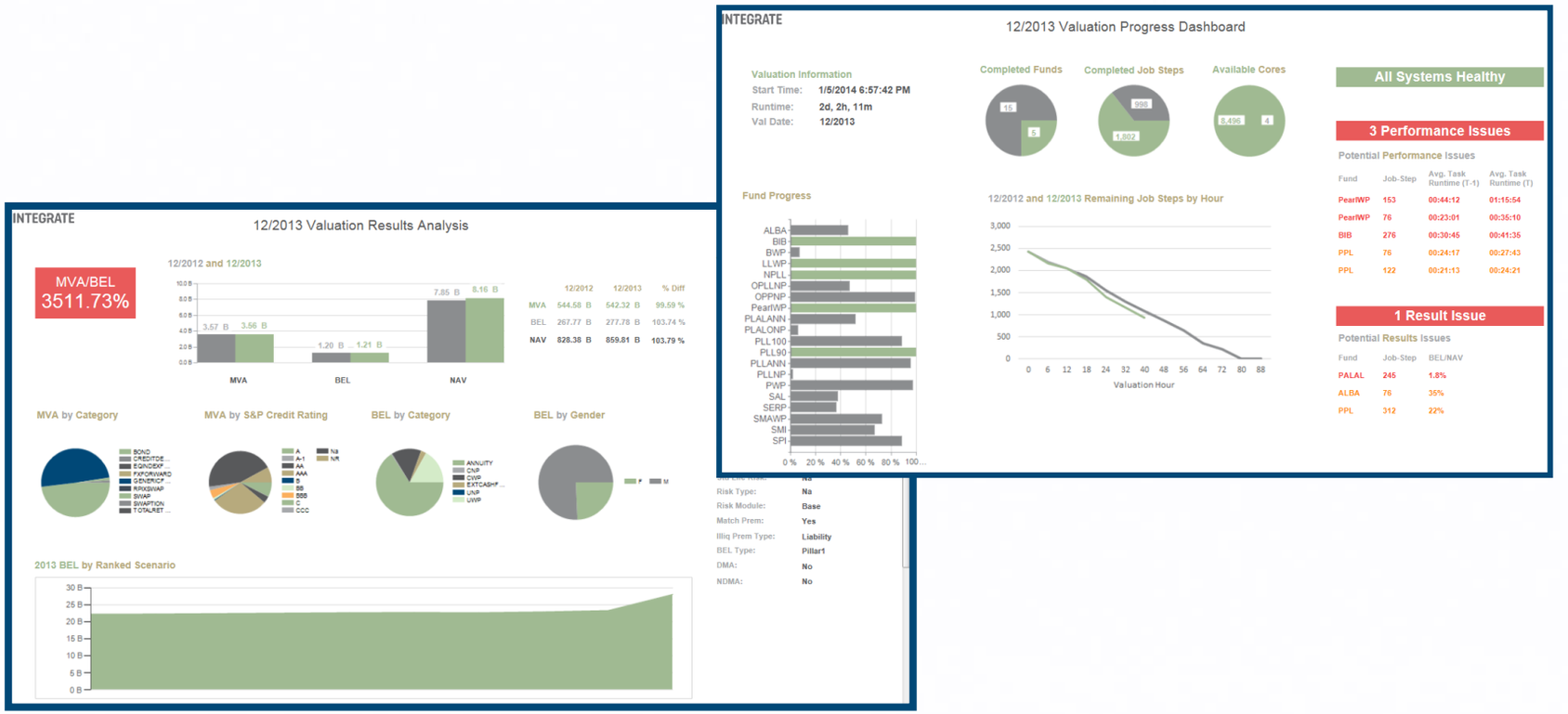
Power BI – Dashboards and Drill Down



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What Integrate will become… including Data Management

- An end-to-end, cloud-based solution, for the life insurance market
- Provide actuarial modeling at scale, using pay-as-you-go pricing model
- Comprehensive ETL, Data Analytics and Reporting capabilities
- Powered by the Microsoft Azure Cloud and Cortana Analytics

- **MG-ALFA:** Complete financial modeling system.
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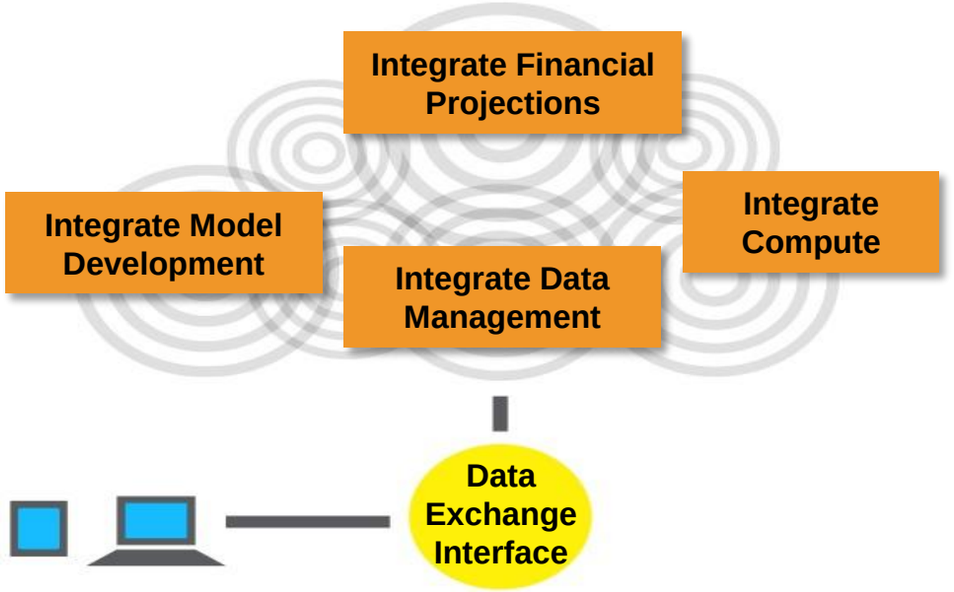
- **IMD:** Provides collaboration, control and tracking when working with models.
- **IFP**: Environment to work on financial projections.
- **IDM**: ETL, Data Analytics and Reporting tool.



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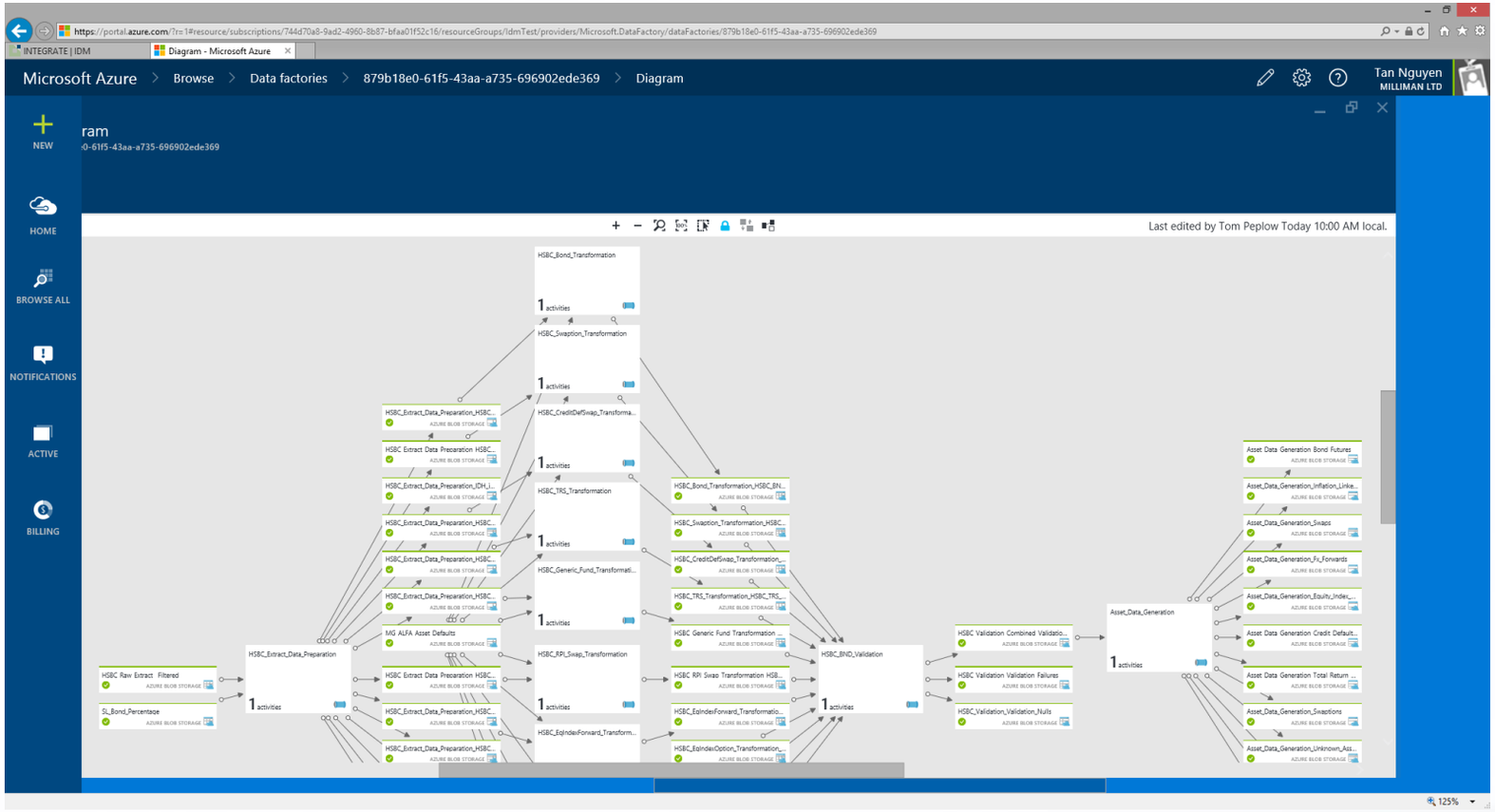
Integrate Data Management Demo

Demo Overview

- **Scenario**: Extract various assets and liabilities inputs from a banking system and transform the data into a format that our Integrate system can use to run its actuarial valuations
- **Milliman product overview**: Integrate Data Management system (Data Management) and a transformation walkthrough
- **Cortana Analytics**: Data Management and Azure Data Factory

Data Management and Azure Data Factory

(Live demo)



Open Discussion

-Questions

-Feedback

Thank You!

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