Presenter Introduction

Peter Myers
BI Expert, Bitwise Solutions
BBus, SQL Server MCSE, MCT, SQL Server MVP (since 2007)
Experienced in designing, developing and maintaining Microsoft database and application solutions, since 1997
Focuses on education and mentoring
Based in Melbourne, Australia

✉ peter.myers@bitwisesolutions.com.au
LinkedIn: http://www.linkedin.com/in/peterjsmyers
Seminar Aim

• Provide IT decision makers, IT professionals and developers with the information they need to commence producing state-of-the-art, integrated Business Intelligence (BI) solutions by using Microsoft BI
• Introduce the next generation of Microsoft self-service analytics with Power BI
• Describe how SQL Server can deliver BI solutions
• Introduce big data and describe how to implement big data solutions
Seminar Outline

- Introduction
- Defining Business Intelligence
- Introducing Microsoft Business Intelligence
- Self-service Analytics with Power BI for Office 365
- End-to-end Corporate BI with SQL Server
- Big Data Solutions with Windows Azure HDInsight
- Conclusion, Q&A
Logistics

• Please silence mobile phones
• Seminar hours
  – Meal breaks
• Restrooms
• Feedback
Presentation Download

• This presentation can be downloaded in PDF from:
Defining Business Intelligence
Defining Business Intelligence

• Today, BI is generally a well-understood term
• According to Gartner, BI is defined as:

A broad category of applications and technologies for gathering, storing, analyzing, sharing and providing access to data to help enterprise users make better business decisions

• Or put more simply... It transforms data into knowledge
• It encompasses a broad spectrum of technologies and usually requires skilled professionals to implement and manage
Defining Business Intelligence

- BI is used by decision makers to:
  - Understand the health of the organization
  - Collaborate on a shared view of data, business and presentation logic
  - Reduce the time to decision

- Its goal is often to:
  - Impact the bottom line by measuring specific operations
  - Enhance competitive advantage

BI is no longer a luxury afforded by a larger companies — it is now considered an essential part of the IT portfolio
Defining Business Intelligence

• BI implementations can be described in terms of:
  – Corporate BI
  – Self-service BI (SSBI)
  – Managed BI
Defining Business Intelligence

Corporate BI

• IT Pros deliver solutions to integrate and transform business operational data to make it useful and relevant to business users
• They commonly design, implement and maintain enterprise data warehouses (EDW), data models and integrated reporting and analytics
• These solutions require significant time, expertise and money
• It is usually understood that these solutions do not address all business needs
Defining Business Intelligence

Corporate BI

8: Clients use various tools to query the data warehouse

Data Sources

Staging Area

Data Warehouse

Data Marts

Manual Cleansing

Clients use various tools to query the data warehouse.
Defining Business Intelligence

Corporate BI (Continued)

• Today, IT may deliver and support a managed, self-service BI collaboration environment to empower analysts to create custom BI solutions
Defining Business Intelligence

Self-service BI

• The goal of SSBI is to empower analysts so that they can design, customize and maintain their own BI solutions
  – Without SSBI, they are otherwise forced to rely entirely upon data and resources made available by IT
  – In reality, though, it is probably happening in an unmanaged way, whether IT allow it or not
Defining Business Intelligence

Self-service BI (Continued)

• SSBI is not a complete solution nor a replacement for corporate BI
  – IT Pros still need to deliver corporate BI
  – So, SSBI is a combination of corporate BI and extensions to empower analysts to more fully exploit it
  – It is not about analysts working in isolation
  – Rather, it is about analysts working more closely with IT Pros to share some of the BI workload

• Used and managed appropriately, it usually proves itself to be invaluable to the organization
Defining Business Intelligence

Self-service BI: Advantages

• The organization becomes more agile, and benefits from the ability to gather and analyze data more quickly
• IT Pros can remained focused on corporate BI
• Analysts can:
  – Access and work with corporate data without reliance on IT
  – Create ad hoc solutions
  – Create personal and team-centric solutions
  – Base decisions on data instead of intuition
  – Make faster and more accurate decisions
Defining Business Intelligence

Self-service BI: Disadvantages

• SSBI can be expensive and time consuming to implement and maintain
  – Analysts will require training, specialized tools and data access
  – Metadata dictionaries should be maintained to provide consistent and reliable access to data

• SSBI queries can impact on corporate system performance and availability
Defining Business Intelligence

Self-service BI: Disadvantages (Continued)

• SSBI solutions can result in duplication of effort, data and logic
  – Commonly referred to as “multiple versions of the truth” or “spreadmart”
• SSBI solutions may not be known to IT, documented, reviewed, approved, backed up, or adequately secured
  – Knowledge of, and expertise to maintain, SSBI solutions could be lost when an analyst leaves the organization
Defining Business Intelligence

Managed BI

• Managed BI is about mutual benefit for IT Pros and analysts, and IT governance
• The goal of clear IT governance is ensure that the investment in IT generates business value and mitigates risk
Defining Business Intelligence

Managed BI (Continued)

• For SSBI, this means ensuring responsible BI by managing with oversight to:
  – Review, approve and audit solutions
  – Ensure trustworthy data is delivered in a compliant, responsive and secure way
  – Ensure data, metadata and logic remain available and current, and is backed up
  – Have visibility into how data is used throughout the organization
  – Ensure appropriate access permissions are enforced
  – Incorporate or upgrade SSBI solutions into corporate BI solutions, if appropriate
Exploring a Power BI Solution
Defining Business Intelligence

Summary

• IT Pros implement corporate BI, and solutions do not usually deliver all user information requirements
  – IT Pros can remain focused on delivering enterprise requirements, and can deliver and support a managed BI environment
  – A partnership between IT and analysts encourages and supports SSBI
• SSBI is not a replacement for, but an extension of, corporate BI
• A good governance process will increase the adoption of BI and mitigate risk
Introducing
Microsoft
Business
Intelligence
Introducing Microsoft BI

Strategy and Vision

• To improve organizations by providing business insights to all employees, leading to better, faster, more relevant decisions
  – Microsoft has a long-term commitment to delivering a complete and integrated BI offering
  – SQL Server has led innovation in the BI space for more than a decade
  – There is widespread delivery of intelligence through Office
  – The platforms are enterprise-grade and affordable
Introducing Microsoft BI

**Familiar User Experience**
- Self-Service Access and Insight
- Data Exploration and Analysis
- Predictive Analysis
- Data Visualization
- Contextual Visualization

**Integrated Content and Collaboration**
- Thin Clients
- Dashboards
- BI Search
- Content Management

**Information Platform**
- Data Warehousing
- Integration Services
- Master Data
- Data Quality
- Analysis Services
  - Data Modeling and Data Mining
- Reporting Services
Introducing Microsoft BI

Excel

- Over the past decade, the core spreadsheet capabilities have been enhanced to enable analysts to analyze, communicate, and manage information.
  - Add-ins provide rich and integrated BI capabilities:
    - Power Query – data acquisition and preparation
    - Power Pivot – data modeling
    - Power View – presentation-ready, and interactive reports
    - Power Map – 3D geospatial visualization
Introducing Microsoft BI

Excel: Complete and Powerful SSBI Tool

- Save to a Power BI site:
  - Scheduled data refresh
  - Power Q&A
  - Data Catalogue
  - Mobile application

- Power View
- Power Map

- Access
- Share

- Clean
- Mash-up

- Power Query
- Power Pivot
Resources

• Microsoft Business Intelligence web site
  – http://www.microsoft.com/bi

• Microsoft Office Excel web site
  – http://office.microsoft.com/excel
  – Try a free one month trial today

• Microsoft Power BI for Office 365 web site
  – http://www.powerbi.com

• MSDN Blog: Power BI
Module Outline

• Data Modeling
  – Power Pivot
• Data Acquisition
  – Power Query
• Data Visualization
  – Power Pivot Reporting
  – Power View
  – Power Map
• Sharing and Collaboration
Exploring a Conventional Excel Solution

Demo ➔
Data Modeling with Power Pivot

Data Acquisition with Power Query

Power Pivot Reporting

Data Visualization with Power View

Data Visualization with Power Map

Power BI Sharing and Collaboration
Data Modeling with Power Pivot

• Excel 2013 includes the workbook data model to mash-up and analyze data
  – Allows importing tables of data from different data sources
  – Creating relationships between tables
  – Creating simple calculated fields (aggregation of single columns)
• The workbook data model is delivered with a client-side version of Analysis Services, known as the xVelocity In-Memory Analytics Engine
Data Modeling with Power Pivot

• The Power Pivot add-in for Excel provides a ribbon tab and a development window to create more sophisticated data models
  – Office Professional Plus and Office 365 ProPlus editions only
  – The add-in is disabled by default

• Data can be sourced from:
  – Copy and paste
  – External data sources
  – Excel linked tables
  – Power Query
Data Modeling with Power Pivot

Deliverables

• An intuitive query-able resource that serves business user experiences
• Integrates data from a variety of data sources, including:
  – Traditional data source, such as relational databases
  – Non-traditional sources, such as data feeds, text files and spreadsheets
• Delivers accelerated access to potential extremely large data volumes – well beyond the row limits of an Excel worksheet
Data Modeling with Power Pivot

Deliverables (Continued)

• Improves access to, and usability of, the data model
  – Friendly names, hierarchies, etc.
• Encapsulates business rules with calculations and key performance indicators (KPIs)
• Supports a rich variety of client tools, including those to deliver:
  – Interactivity, data visualization, reports, scorecards, dashboards, and custom experiences
• Represents a “single version of the truth”
Data Modeling with Power Pivot

Development Methodology

1. Create a workbook and open the Power Pivot Window
2. Import data to create tables
3. Define relationships between tables
4. Enhance the data model design with hierarchies, calculated columns, calculated fields and KPIs
5. Prepare the data model for Power View
6. Produce reports based on the data model
7. Publish the workbook to SharePoint/Power BI
8. Configure automatic data refresh
Introducing Power Pivot

Demo →
Data Modeling with Power Pivot

Opportunities

• Produce a “single version of the truth” data model
• Store volumes of data in excess of worksheet limits (1,048,576 rows) and with high compression (10x on average)
• Easily and efficiently integrate data from different data sources:
  – Corporate, local or external
  – Eliminate the use of the VLOOKUP function
• Source data from different data formats – relational, multidimensional, data feed, files
• Easily refresh data, when required
Data Modeling with Power Pivot

Opportunities (Continued)

• Enhance the data model with hierarchies
• Encapsulate business rules with calculations
  – Produce difficult Excel logic in the data model with DAX
  – Produce time intelligence formula
• Enable consistent performance monitoring with KPIs
Data Modeling with Power Pivot

Resources

• Power Pivot web site

• Book: “Microsoft Excel 2013: Building Data Models with PowerPivot”
  – Publisher: Microsoft Press
  – Authors: Alberto Ferrari and Marco Russo

• DAX Resource Center
Data Modeling with Power Pivot

Resources (Continued)

- **Whitepaper: DAX in the BI Tabular Model**
  - Includes a sample Excel workbook

  - Publisher: Holy Macro! Books
  - Author: Rob Collie
Data Modeling with Power Pivot

Data Acquisition with Power Query

Data Visualization with Power View

Data Visualization with Power Map

Power Pivot Reporting

Power BI Sharing and Collaboration
Data Acquisition with Power Query

• Power Query is a new add-in for Excel to discover, transform and consume data

• Allows defining queries which run a sequence of steps to import and reshape data from one or more data sources
  – Query steps are defined by using Power Query Formula Language
    • Simple query step logic does not require writing formulas
    • Advanced query step logic can be written to leverage the full power of the language
Data Acquisition with Power Query

• Query results can be loaded into an Excel table or the workbook data model
• Power Queries can be published to the Power BI Data Catalogue (cloud)
• Supports a large collection of data source types:
  – Web (HTML table)
  – File
  – Database
  – Other sources
Data Acquisition with Power Query

Data Source Types

File:
- From Excel
- From CSV
- From XML
- From Text
- From folder

Database:
- From SQL Server Database
- From Windows Azure SQL Database
- From Access Database
- From Oracle Database
- From IBM DB2 Database
- From MySQL Database
- From PostgreSQL Database
- From Teradata Database

Other Sources:
- From SharePoint List
- From OData Feed
- From Windows Azure Marketplace
- From Hadoop File (HDFS)
- From Windows Azure HDInsight
- From Windows Azure Blob Storage
- From Windows Azure Table Storage
- From Active Directory
- From Microsoft Exchange
- From Facebook
- Blank Query

Write a query from scratch.
Introducing Power Query

Demo
Data Acquisition with Power Query

Opportunities

• Replace legacy Excel data retrieval logic with Power Query queries
  – Create refreshable queries to source, filter and shape data
  – Eliminate the requirement to manually prepare and load data
  – Eliminate complex transformational logic in worksheets and macros
  – Integrate query results from different data sources
  – Load data directly into workbook data models

• Leverage new data source types:
  – HDInsight, Azure storage, Active Directory, Exchange, Facebook, etc.

• Publish libraries of queries for discovery and reuse
Data Acquisition with Power Query

Resources

• Microsoft Download Center
  – Microsoft Power Query for Excel

• TechEd North America 2013
  – DBI-B225: “Microsoft “Data Explorer” for Excel: Discover, Combine, and Refine your Data” by Faisal Mohamood

• Power Query for Excel Formula Language Specification
  – http://go.microsoft.com/fwlink/?LinkId=320633
Data Acquisition with Power Query

Resources (Continued)

• Power BI Blog
  – Blog entry 03 Mar 2014: “Microsoft Adds Connectivity for SAP BusinessObjects to Power BI for Office 365”
Data Modeling with Power Pivot

Data Acquisition with Power Query

Data Visualization with Power View

Data Visualization with Power Map

Power Pivot Reporting

Power BI Sharing and Collaboration
Power Pivot Reporting

- Excel reporting based on the Power Pivot data model can be achieved by using the “ThisWorkbookDataModel” workbook connection:
  - PivotTables and PivotCharts
  - CUBE functions
  - Apps for Office
  - Power View
  - Power Map

Covered in later topics
Power Pivot Reporting

PivotTables

• The PivotTable Fields exposes the resources of the data model:
  – Calculated fields, KPIs, and hierarchies – grouped by table

• Four drop zones are used to configure the layout of the PivotTable
  – Filters
  – Columns and Rows
  – Values – calculated fields only

• Slicers and timelines can be added to enable interactive filtering
Power Pivot Reporting

PivotCharts

• PivotCharts can be based on a PivotTable
• Can be placed on the same or separate worksheet as the PivotTable
• Configuration is similar to the PivotTable
• Two drop zones change name and behavior:
  – Column Labels becomes Legend Fields
  – Row Labels becomes Axis Fields
Power Pivot Reporting

CUBE Functions

• Excel includes seven CUBE functions that can retrieve data model members and values:
  – CUBEMEMBER returns a member from a cube dimension
  – CUBEVALUE returns a value from the cube, and can be filtered using report filters and slicers
  – CUBESET returns a set of members
  – CUBESETCOUNT returns the count of members in a set
  – CUBERANKEDMEMBER returns the nth member in a set
  – CUBEMEMBERPROPERTY returns a member property
  – CUBEKPIMEMBER returns a KPI property
Power Pivot Reporting

Apps for Office

• Apps for Office are new in Office 2013
• Allow visualizing data from Excel tables or worksheet ranges
• They carry a light footprint and use web standards-based technologies such as HTML5, JavaScript, CSS3, XML, and REST API
• Can be embed into Office documents and use a browser control in a secure app runtime environment
• Apps are discoverable and are downloaded from the Office Store
• Some apps are free 😊
Power Pivot Reporting

- If the workbook will be rendered by Excel Services, only use Excel client features that are supported
  - Does not support macro-enabled workbooks
  - Supported features:
    - Charts
    - Embedded images
    - Conditional formatting
    - Slicers
    - Timelines
    - Sparklines
    - Hyperlinks
    - Outlining
    - Apps for Office
Reporting with the Excel CUBE Functions

Demo
Power Pivot Reporting

Opportunities

- Publish workbooks to share workbook data models and associated reports
- Produce interactive report layouts, including dashboards
- Refactor legacy workbook report layouts with CUBE functions to surface Power Pivot data
- Extend data visualization capabilities with Apps for Office
Power Pivot Reporting

Resources

• Excel Cube Functions wiki site
  – http://www.excelcubefunctions.com

• Book: “Microsoft SQL Server 2008 MDX Step by Step”
  – Publisher: Microsoft Press
  – Author: C. Ryan Clay

• Overview of Apps for Office

• Book: “Excel Dashboards and Reports”
  – Publisher: Wiley
  – Author: Michael Alexander
Data Visualization with Power View

• Power View is a report authoring experience in Excel
• Requires a tabular data model, including a Power Pivot data model
• Report sheets can be added to the workbook and configure to produce interactive data exploration, visualization, and presentation experiences
  – Highly visual design experience
  – Rich meta-driven interactivity
  – Presentation-ready at all times
Data Visualization with Power View

Example

Sales Analysis

Revenue by Demographic

Quantity, Revenue, and Product Count by Category

Region | Revenue | Profit | Profitability Status
--- | --- | --- | ---
Midwest | $42,575.00 | -$3,275.00 | 3 Novice Airplane RTF
New England | $9,490.00 | -$730.00 | 3 Novice Airplane RTF
Northeast | $22,815.00 | -$1,755.00 | 3 Novice Airplane RTF
Pacific | $13,455.00 | -$1,035.00 | 3 Novice Airplane RTF
Southern | $53,235.00 | -$4,095.00 | 3 Novice Airplane RTF
Southwest | $24,635.00 | -$1,895.00 | 3 Novice Airplane RTF
Total | $166,205.00 | $-|...
**Data Visualization with Power View**

**Data Model Preparation**

- The data model can be prepared to fully exploit the Power View experience by:
  - Defining friendly names
  - Defining synonyms (for Power Q&A)
  - Adding descriptions
  - Setting column and calculated field data formats
  - Setting column categorizations

- Images can be enabled by:
  - Storing image data, or
  - Referencing external images (not supported in Power BI sites)
Data Visualization with Power View

Data Model Preparation (Continued)

• The Advanced ribbon tab allows:
  – Configuring table default field sets
  – Configuring table behavior:
    • Row identifier (like primary key)
    • Keep unique rows
    • Default label and image

• “Automatic” calculated field behavior can be enabled
  – Applies to non-hidden numeric columns
  – Default aggregation can be set with the Summarize By property
Data Visualization with Power View

Report Design

• Supported visualization types:
  – Tables (default)
  – Matrices
  – Charts (bar, column, line, pie, and scatter)
  – Cards
  – Tiles
  – Maps (requires internet connectivity)

• Filtering can be achieved in the filter pane (background), or for each visualization
  – Slicers and tiles can also be used to filter
Introducing Power View

Demo
Data Visualization with Power View

Opportunities

• Configure Power Pivot data models with reporting properties to exploit Power View features
  – Images, default field sets, “automatic” calculated fields, etc.

• Create interactive and visually impressive Power View reports based on Power Pivot data models

• Educate users on:
  – How to interact with Power View reports
  – How to create their own Power View reports, even for ad hoc (one-off) analysis
Banking on BI

“Power View gives users... what-if analysis in minutes instead of days...”

RON VAN ZANTEN
VICE PRESIDENT
OF DATA QUALITY
Data Visualization with Power Map

• Power Map is a new add-in for Excel to interactively visualize spatial data in 3D
• Requires a tabular data model, including a Power Pivot data model
• Animated tours can be created and played in the Excel client or exported to MP4 video
  – Static images can also be copied to the clipboard
Data Visualization with Power Map

Development Methodology

1. Create a workbook and develop a Power Pivot data model, or connect to an external tabular database
2. Create tours, consisting of a sequence of scenes
3. Configure the map and map layout for each scene
4. Introduce layer(s) to visualize data superimposed on each scene
5. Annotate the map with charts, textboxes and legends
6. Configure transition properties between the scenes
7. Produce and share an MP4 video of the tour  
   Optional
Introducing Power Map

Demo
Data Visualization with Power Map

Opportunities

• Present interactive tours from the desktop
• Produce and share tours of geospatial videos
  – Videos can be:
    • Embedded into PowerPoint presentations
    • Uploaded to YouTube
    • Added to SharePoint document libraries
Data Visualization with Power Map

Resources

- Microsoft Download Center
  - Power Map Preview for Excel 2013
Data Modeling with Power Pivot

Data Acquisition with Power Query

Power Pivot Reporting

Data Visualization with Power View

Data Visualization with Power Map

Power BI Sharing and Collaboration
Sharing and Collaboration

• Power BI solutions are authored by using the Excel client
• It is usually inappropriate to share the solutions by forwarding the workbook to other users
  – Requires that the user has Excel installed, and possibly the add-ins
  – The user can view data model data, and modify metadata
  – Current data may not be available as data refresh may not work from their location, or by using their credentials
  – Workbook versions are difficult to control
  – Permissions can no longer be centrally managed
  – IT cannot monitor usage
Sharing and Collaboration

• It is preferable to share Power BI solutions in managed ways
• Microsoft provide three managed alternatives:
  – SharePoint 2013 (on-premises) – Enterprise Edition
  – Office 365 (cloud) – ProPlus and E3 Editions
  – Power BI for Office 365 (cloud)
Sharing and Collaboration
Power BI for Office 365

• These services extend the self-service BI capabilities in Excel by making them available in a collaborative online environment:
  – Power BI Sites
  – Power BI Q&A
  – Query and Data Management
  – Power BI Windows Mobile BI App
Sharing and Collaboration

Power BI Sites

• Power BI sites application customizes a SharePoint Online site for Power BI purposes and activities
• Available with a subscription to Power BI for Office 365
• Only supports Excel workbooks, which, when rendered to the browser, are viewed with the Excel Web App
  – Power View reports can be optionally displayed by using HTML5
• Supports workbooks up to 250MB in size
Sharing and Collaboration

Power BI Q&A

- Q&A enables a broad audience of users to easily discover and explore a workbook data model by using natural language
- Submitted questions in English are responded to with data visualizations and reports
- The responses are interactive, and so can be modified to further refine the data exploration requirements
- Delivers auto-complete, and featured and auto-suggest questions to prompt and guide the process
Sharing and Collaboration

Query and Data Management

• Business users can share and manage queries, and can analyze the usage of their shared data by using the Manage Data portal.
• Queries are shared to the Data Catalogue which includes query metadata and data for the purpose of preview.
• The Manage Data portal enables:
  – Viewing usage analytics of shared queries (searched or imported).
  – Viewing and managing data sources used by Power Query queries, annotating them with information to improve their discovery.
Sharing and Collaboration

Query and Data Management

Query Analytics

Queries shown in search

Top Searched Queries

<table>
<thead>
<tr>
<th>Query</th>
<th>Times Searched</th>
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</thead>
<tbody>
<tr>
<td>Alcohol consumption by year and type</td>
<td>146</td>
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<tr>
<td>Alcohol Consumption</td>
<td>138</td>
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<tr>
<td>Alcohol Stock Symbols</td>
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<tr>
<td>Flags</td>
<td>36</td>
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<tr>
<td>Alkohol fogyasztás országonként, típusonként, éve...</td>
<td>23</td>
</tr>
<tr>
<td>Beer import</td>
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</tr>
</tbody>
</table>

Clicks from search

Top Clicked Queries

<table>
<thead>
<tr>
<th>Query</th>
<th>Times Used</th>
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<tbody>
<tr>
<td>Alcohol consumption by year and type</td>
<td>16</td>
</tr>
<tr>
<td>Alcohol Consumption</td>
<td>3</td>
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<td>Flags</td>
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<td>Alcohol Stock Symbols</td>
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<td>Alkohol fogyasztás országonként, típusonként, éve...</td>
<td>0</td>
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<tr>
<td>Beer import</td>
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</tr>
</tbody>
</table>

Top Query Users

<table>
<thead>
<tr>
<th>User</th>
<th>Queries Used</th>
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<tbody>
<tr>
<td>Tamas Polner</td>
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<tr>
<td>Peter Kalan</td>
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</tr>
<tr>
<td>Denis Churin</td>
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</tr>
<tr>
<td>Ric Howe (Brook Street)</td>
<td>2</td>
</tr>
<tr>
<td>Stefan Kummert</td>
<td>1</td>
</tr>
<tr>
<td>Manuel Escriva</td>
<td>1</td>
</tr>
<tr>
<td>Jim Sun</td>
<td>1</td>
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</tbody>
</table>
Sharing and Collaboration

Windows Mobile BI App

• Provides live mobile access to the important business information stored in a user’s Office 365 account
• The app enables viewing and interacting with Excel and Power View content
• Requires Windows 8 or Windows RT tablet or PC, including Surface
  – Supported processors: x86, x64, ARM
• Currently, the app is not supported on:
  – iPad, Mobile phones or Android devices
Exploring the Power BI Site Demo
Sharing and Collaboration

Power BI: Licensing and Availability Overview

Cloud based
Subscription model
Priced per user per month
Available Feb 2014
Two options:

<table>
<thead>
<tr>
<th>Microsoft Online Subscription Program</th>
<th>Purchase on PowerBI.com</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microsoft Volume Licensing</td>
<td>Reach out to your Microsoft partner for more information</td>
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Sharing and Collaboration
Power BI: How to Buy (Continued)

<table>
<thead>
<tr>
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<th>Power BI Add-on (SharePoint Online Plan 2)</th>
<th>Power BI Add-on (Office 365 E3 or E4)</th>
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Sharing and Collaboration

Opportunities

• Provision Power BI sites to maintain a secure, widely-accessible and centralized location for discovering and sharing “single version of the truth” data, logic and reports
• Publish Power Query queries for discovery and data consumption
• Enable data refresh of data models, even to on-premises data sources
Sharing and Collaboration
Opportunities (Continued)

• Use natural language query to enable intuitive report requests
  – Promote featured questions as starting points for data exploration
  – Reduce the number of reports to create
• Deliver Power View reports to any HTML5-capable mobile device, without a dependency on Silverlight
• Stay connected to favorite reports with the Windows mobile BI app
• Enable IT monitoring of access and resource usage
Sharing and Collaboration

Resources

• Microsoft Power BI for Office 365 web site
  – http://www.powerbi.com
  – Sign up for the free 30 day trial to preview the Power BI service

• MSDN Blog: Power BI
Power BI Summary
Empowering Users with Self-service in Excel

Discover
Search and combine public and internal data with **Power Query**

Analyze
Model & analyze 100’s of millions of rows lightning fast with **Power Pivot**

Visualize
Explore and visualize data in new ways with **Power View** and **Power Map**
Power BI Summary
Connecting and Collaborating in Office 365

Share
Share queries & workbooks and refresh from on-premises data with BI Sites

Find
Find answers with search-based data visualization in Q&A

Mobile
Stay connected from anywhere with HTML5 and the Power BI mobile app
Power BI Summary

Resources

• Power BI Demo Contest
  – Over 50 imaginative solutions produced with real data by using Power BI
  – Finalists: [https://www.facebook.com/microsoftbi/app_112813808737465](https://www.facebook.com/microsoftbi/app_112813808737465)
Power BI

SQL Server

Big Data
SQL Server BI

- SQL Server also can play a major role in delivering BI
SQL Server BI

• Standard, Business Intelligence and Enterprise editions provide BI capabilities to deliver larger scale BI solutions
  – Data warehousing
  – Enterprise Information Management (EIM):
    • Extract, Transform and Load (ETL) with Integration Services
    • Master Data Management with Master Data Services
    • Data Quality Assurance with Data Quality Services
  – Data modeling (multidimensional and tabular)
  – Data mining
  – Reporting

• SQL Server 2014 is due for release in the coming months
**SQL Server 2014 Investments**

<table>
<thead>
<tr>
<th>In-memory technologies</th>
<th>Enhanced high availability</th>
<th>New hybrid scenarios</th>
<th>Other investments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>In-Memory OLTP</strong></td>
<td><strong>AlwaysOn enhancements</strong></td>
<td><strong>Backup to Azure</strong></td>
<td><strong>Better together with Windows Server</strong></td>
</tr>
<tr>
<td>• 5–20x performance gain for OLTP integrated into SQL Server</td>
<td>• Increased availability and improved manageability of active secondaries</td>
<td>• Easy to implement and cost effective disaster recovery solution to Windows Azure Storage</td>
<td>• Windows Server 2012 ReFS support</td>
</tr>
<tr>
<td><strong>In-Memory Data Warehouse</strong></td>
<td><strong>Online database operations</strong></td>
<td></td>
<td>• Online resizing VHDX</td>
</tr>
<tr>
<td>• 5–25x performance gain and high data compression</td>
<td>• Increased availability for index and partition maintenance</td>
<td></td>
<td>• Microsoft Hyper-V replica</td>
</tr>
<tr>
<td>• Updatable and clustered</td>
<td></td>
<td></td>
<td>• Windows “Blue” support</td>
</tr>
<tr>
<td><strong>SSD Buffer Pool Extension</strong></td>
<td></td>
<td><strong>High availability to Azure Virtual Machines</strong></td>
<td><strong>Extending Power View</strong></td>
</tr>
<tr>
<td>• 4–10x RAM and up to 3x performance gain transparently for apps</td>
<td></td>
<td>• Easy to implement and cost effective high availability solution with Windows Azure Virtual Machines</td>
<td>• Enable Power View on existing analytic models and support new multidimensional models</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Deploy to Azure</strong></td>
<td></td>
</tr>
</tbody>
</table>
SQL Server Parallel Data Warehouse (PDW)

Insights On Any Data of Any Size

- Built for Big Data
- Next-generation Performance at Scale
- Engineered for Optimal Value
PDW and PolyBase

Enabling Integrated Query Across Hadoop and Relational Data

• Single query for relational and Hadoop data
• Process data in place
• Use existing skills with simple T-SQL command
• Future expansion to other data sources
SQL Server BI

Resources

• Microsoft SQL Server web site
  – http://www.microsoft.com/sqlserver
  – Evaluate SQL Server for free for 90 days

• Microsoft SQL Server 2014 web site
  – Download CTP2 free trial today

• Microsoft Parallel Data Warehouse (PDW) web site
Power BI

SQL Server

Big Data

01100
10010
00101
Module Outline

• Introducing Big Data
• Introducing Hadoop
• Introducing Windows Azure HDInsight
• Demonstrations
Introducing Big Data

“Big data is a collection of data sets so large and complex that it becomes awkward to work with using on-hand database management tools. Difficulties include capture, storage, search, sharing, analysis, and visualization.”

– Wikipedia
Introducing Big Data

• Big data solutions deal with complexities of:

VOLUME (Size)

VARIETY (Structure)

VELOCITY (Speed)
Introducing Big Data

Data Complexity: Variety and Velocity

- Click stream
- Wikis/blogs
- Sensors/RFID/Devices
- Social sentiment
- Audio/video
- Advertising
- Mobile
- Collaboration
- eCommerce
- Web 2.0
- Web Logs
- Digital Marketing
- Search Marketing
- Recommendations
- Log files
- Spatial and GPS coordinates
- Data market feeds
- eGov feeds
- Weather
- Text/image

- Petabytes
- Terabytes
- Gigabytes
- Megabytes

ERP/CRM
- Payables
- Contacts
- Payroll
- Deal Tracking
- Inventory
- Sales Pipeline
Introducing Big Data
Enabling Responses to New Questions

- What’s the social sentiment of my product?
- How do I optimize my services based on patterns of weather, traffic, etc.?
- How do I better predict future outcomes?
Introducing Hadoop

• Apache Hadoop is for big data
• It is a set of open source projects that transform commodity hardware into a service that can:
  – Store petabytes of data reliably
  – Execute huge distributed computations
• Key attributes:
  – Open source
  – Highly scalable
  – Runs on commodity hardware
  – Redundant and reliable (no data loss)
  – Batch processing centric – using a “Map-Reduce” processing paradigm
Introducing Hadoop

How it Works
Introducing Hadoop

How it Works

SECOND, TAKE THE PROCESSING TO THE DATA

RUNTIME

Code

// Map Reduce function in JavaScript
var map = function (key, value, context) {
    var words = value.split(/[^a-zA-Z]/);
    for (var i = 0; i < words.length; i++) {
        if (words[i] !== "")
            context.write(words[i].toLowerCase(), 1);
    }
};

var reduce = function (key, values, context) {
    var sum = 0;
    while (values.hasNext()) {
        sum += parseInt(values.next());
    }
    context.write(key, sum);
};
Introducing Windows Azure HDInsight

- HDInsight is Microsoft’s Hadoop-based service that enables big data solutions in the cloud
  - Available as a Windows Azure service
  - HDInsight Server is available to install on-premises only for the purpose of development and testing
- Empowers organizations with new insights on previously untouched unstructured data, while connecting to the most widely used BI tools on the planet
Creating Big Data Solutions by Using HDInsight Server

Demo
Summary

• Big data refers to data sets so large and/or complex that they become awkward to work with in conventional ways

• Hadoop can store petabytes of data reliably and execute huge distributed computations
  – Big data query results often involve significant latency

• Power BI includes authoring add-ins to query, analyze and visualize data sourced from Windows Azure HDInsight

• SQL Server can connect to, query, and consume big data results – big data is just another data source!
Klout is an organization that measures influence online.

A Microsoft case study describes how Klout produced a multidimensional BI Semantic Model (cube) based on their open-source Hive data warehouse system.
Big Data

Resources

• Microsoft Big Data web site
  – http://www.microsoft.com/bigdata

• Windows Azure HDInsight web site

• Hortonworks tutorials
  – http://hortonworks.com/tutorials
  – Numerous tutorials are available to learn about big data by using the Hortonworks Sandbox

• Klout case study
Conclusion
Summary
Take Action and Operationalize

- Quality and accuracy
- Scale user-driven BI
- Action over data in real time
- Security, governance, and compliance
- Cloud and on-premises

Office
Windows Azure
Windows Server
Microsoft SQL Server
Get Started Today!

- Explore Excel 2013 in the new Office
- Sign up for the Power BI for Office 365 preview at www.powerbi.com
- Ask us about our Immersion Experience program
Presentation Download

- This presentation can be downloaded in PDF from: