Power BI Architecture & Functionality in SharePoint Online

SharePoint Saturday
9/20/2014

Melissa Coates
BI Architect, BlueGranite
Blog: sqlchick.com
Twitter: @sqlchick
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Melissa Coates
Business Intelligence & Data Warehousing Developer
Charlotte, NC

BI Architect with BlueGranite
www.blue-granite.com

Co-Leader
Charlotte BI Group
http://charbigroup.com

Co-Organizer
SQL Saturday
#237 | CHARLOTTE, BI EDITION 2013

Blog: www.sqlchick.com
Twitter: @sqlchick

Microsoft Most Valuable Professional
Agenda
Administering & Managing the Power BI Environment

- Overview of Power BI in SharePoint Online End-to-End
- Comparisons: On-Premises vs. Cloud
- Prerequisites + System Requirements
- Data Source Connectivity Options
- Data Catalog
- Wrap-Up & Questions
OVERVIEW
OF
POWER BI IN
SHAREPOINT ONLINE
END-TO-END
Overview of Power BI

Insights in Excel
1 Billion Office Users

Collaborate in Office 365
1 in 4 enterprise customers on Office 365

Add-ins to prepare & visualize data:
✓ Power Query
✓ Power Pivot
✓ Power View
✓ Power Map

O365 adds additional capabilities:
✓ Collaboration, sharing, viewing
✓ Scheduled Data Refresh
✓ Q&A (Natural Language)
✓ Mobile App
✓ Enterprise Search
✓ Share & Certify Queries
The 4 Add-Ins

**Excel Workbook**
- **Power Query**
  - Search for organizational data,
  - Search for public (cloud) data,
  - Import, merge, shape, & cleanse data,
  - Manage shared queries & certify queries

- **Power Pivot**
  - Create in-memory data model,
  - Create hierarchies & KPIs,
  - Create derived fields & calculations

- **Power View**
  - Analyze, display & visualize the data

- **Power Map**
  - Create maps & tours to geographically view the data

✓ Excel is used for preparation of data & reports
Office 365

- **Office 365 is subscription-based software plus services** in the cloud
- **O365 serves as the collaboration area for Power BI**
- **O365 integration significantly extends Excel functionality**
- **Power BI is a multi-tenant service**
SharePoint App

The **Power BI app** can be downloaded from the **SharePoint Store** *(i.e., to initially set up & provision the Power BI Site)*

The “**AppCatalog**” central site allows you to deploy the app once for the tenant; then all sites & subsites can use the app.

Power BI is currently only available in Office 365 SharePoint Online. It is not available in SharePoint on-premises. (Yet?)
Delivery Modes for Power BI

**Power BI Site (web browser)**
Currently Silverlight
HTML5 in preview
Only supports XLSX files

**Mobile App**
Download from the Windows Store
Supports Windows 8.1
iOS app coming later this year
Power BI Environment End-to-End
Multiple Admin Centers in Office 365

**O365 Admin Center**
- Subscriptions, licensing, user accounts, groups
- Assign **Power BI licenses** to individual users *(note: administrator needs license too)*
- Health status & planned maintenance
- etc...

**SharePoint Online (SPO) Admin Center**
- Site collections
- Storage quotas, server resource quotas
- SharePoint Store apps (like Power BI)
- etc...

**Power BI Site Admin Center**
- Oversee & monitor **system health**
- Setup **Data Management Gateway & Data Sources** to handle refresh
- Setup **OData feeds** to make corporate data sources easier to discover
- **Role** management for admins & data stewards
Ways to Access Power BI Workbooks (1/4)

**Power BI Site** (i.e., the Power BI App in the browser)

Ways to Access Power BI Workbooks

Traditional Document Library View

The “All Documents” view provides access to library settings & permissions

https://DomainName.sharepoint.com/SubsiteNameIfApplicable/_layouts/15/start.aspx#/DocumentLibraryName/Forms/AllItems.aspx
Ways to Access Power BI Workbooks (3/4)

Direct URL Access – No Menu Bar
WopiFrame.aspx is invoked to view the workbook in an iFrame

https://DomainName.sharepoint.com/_layouts/15/WopiFrame.aspx?sourcedoc={GUIDForReport}&action=embedview
Ways to Access Power BI Workbooks

Direct URL Access – With Menu Bar

WopiFrame.aspx is invoked to view the workbook in an iFrame

COMPARISON: ON-PREMISES SHAREPOINT VS. HYBRID POWER BI
## Feature Comparisons

<table>
<thead>
<tr>
<th>Feature</th>
<th>SharePoint Power Pivot Gallery</th>
<th>Power BI for Office 365</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Workbooks as a Data Source (i.e., ability to segregate data model from reports)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>(2) Row-Level Security</td>
<td>Yes (Only if SSAS used as data source)</td>
<td>No (Only Power Pivot currently which is File-Based Security)</td>
</tr>
<tr>
<td>(3) Power View for SharePoint (rdlx)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>(4) Power View for Excel</td>
<td>Some support</td>
<td>Yes</td>
</tr>
<tr>
<td>(5) Max Workbook Size</td>
<td>2GB</td>
<td>Not enabled: 10MB Enabled: 250MB**</td>
</tr>
<tr>
<td>(6) Browser Edit Max</td>
<td>No</td>
<td>30MB</td>
</tr>
<tr>
<td>(7) Thumbnail Previews</td>
<td>Yes (Silverlight)</td>
<td>Yes (Silverlight→HTML)</td>
</tr>
</tbody>
</table>

** 250MB max applies to data in the data model - only 10MB or less can be in the worksheet.
<table>
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<tr>
<td>(8) Single View Across Multiple Doc Libraries</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>(9) Q&amp;A Natural Language</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>(10) Mobile App &amp; HTML5 in Web</td>
<td>No (Silverlight)</td>
<td>Yes</td>
</tr>
<tr>
<td>(11) Enterprise Search (OData and/or Shared Power Query)</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>(12) Use of Power Query for Importing to Power Pivot</td>
<td>No</td>
<td>Yes (Still only some supported for refresh)</td>
</tr>
<tr>
<td>(13) Licensing</td>
<td>SharePoint Enterprise + SQL Server Enterprise</td>
<td>Office 365 with Power BI</td>
</tr>
<tr>
<td>(14) Fast Release Cycles</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
## Feature Comparisons (3/3)

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<th>Feature</th>
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<th>Power BI for Office 365</th>
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<tbody>
<tr>
<td>(15) SSAS Pre-Optimized</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>(16) Browser View Options</td>
<td>Gallery View Theatre View Carousel View All Documents</td>
<td>App View All Documents</td>
</tr>
<tr>
<td>(17) Power View Export to PPT</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>(18) Management Dashboard</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
PREREQUISITES +
SYSTEM REQUIREMENTS
Prerequisite: Office

✓ **Office**
  - **O365 ProPlus** or Office 2013 Professional Plus (reduced functionality if using an older version of Excel or Power Pivot)
  - Preferably use the **Click-to-Run** (streamed) installation of Office instead of MSI (to get latest features such as Synonyms in Power Pivot)
  - All users need to be on the **same version** of Office (same build #) or errors will occur when users collaborate on a file
  - **64-bit** is highly recommended if possible

✓ **Power Pivot**
  - Enabled through COM add-ins (it’s native Excel 2013 add-in)

✓ **Power Query**
  - Separate download & installation (**still in Public Preview mode – licensing hasn’t been announced yet**)
  - **Internet connectivity** for Online Search
  - **Signed in** to the account which is associated to the Power BI subscription
Prerequisite: Office

✓ **Power View**
  - Enabled through COM add-ins (it’s a native Excel 2013 add-in)
  - **Internet connectivity** for spatial coordinates & geocoding using Bing Maps
  - Silverlight 5

✓ **Power Map**
  - Enabled through COM add-ins (it’s a native Excel 2013 add-in)
  - To be supported & get updates, it requires an **O365 ProPlus** subscription
    - Preview (GeoFlow) will remain available in Office 2013 but no updates & not supported
    - Will be added to next major version of Excel as a native add-in
  - **Internet connectivity** for spatial coordinates & geocoding using Bing Maps
  - Microsoft .NET Framework 4.0
  - DirectX10 (DDI version 10 or higher) ← Power Map won’t work in many virtualized environments
  - Latest graphics driver / display adapter
Prerequisite: SharePoint Online Plan 2

✓ The O365 **E3 or E4 Plan** already has the SPO Online Plan 2 prerequisite. More benefits for the price if Power BI is added onto E3 or E4.

<table>
<thead>
<tr>
<th>See also</th>
<th>Small business</th>
<th>Midsize business</th>
<th>Enterprise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office 365 ProPlus</td>
<td>Office 365 Small Business</td>
<td>Office 365 Midsize Business</td>
<td>Office 365 Enterprise E1</td>
</tr>
<tr>
<td>Education plans</td>
<td>Office 365 Small Business Premium</td>
<td>Hosted email (Exchange Online Plan 1)</td>
<td>Office 365 Enterprise E3</td>
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<tr>
<td>Government plans</td>
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<td>Office 365 Enterprise E4</td>
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<tr>
<td>Nonprofit plans</td>
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<tr>
<td>FAQ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Office for home</td>
<td></td>
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</tr>
</tbody>
</table>

- **Office 365 Small Business**
  - $5.00 user/month
  - Annual payment
  - Buy now
  - Free trial

- **Office 365 Midsize Business**
  - $12.50 user/month
  - Annual payment
  - Buy now
  - Free trial

- **Hosted email (Exchange Online Plan 1)**
  - $15.00 user/month
  - Annual payment
  - Buy now
  - Free trial

- **Office 365 Enterprise E1**
  - $4.00 user/month
  - Annual payment
  - Buy now
  - Free trial

- **Office 365 Enterprise E3**
  - $8.00 user/month
  - Annual payment
  - Buy now
  - Free trial

- **Office 365 Enterprise E4**
  - $20.00 user/month
  - Annual payment
  - Buy now
  - Free trial

- **Office 365 Small Business Premium**
  - $15.00 user/month
  - Annual payment
  - Buy now
  - Free trial

- **Office 365 Midsize Business**
  - $20.00 user/month
  - Annual payment
  - Buy now
  - Free trial

- **Pricing is not including Power BI subscription**

Prerequisite: Power BI Licensing

- Can be purchased for just a subset of O365 user base.
- Administrator needs a Power BI license.
Prerequisite: Newer, Patched Computers

✓ **Client Computer**
  - O365 has policies that require client computers be kept up to date - this ensures consistent & predictable product support

✓ **Browser**
  - Latest or immediately prior version of IE
  - The latest release of Chrome, Firefox, or Safari

✓ **Operating System for Office 2013 and O365 ProPlus**
  - Windows 7
  - Windows 8
  - Windows Server 2008 R2
  - Windows Server 2012

✓ **System Specs**
  - As much as you can afford for the business user machines (especially RAM)
DATA CONNECTIVITY
OPTIONS
Role of the Data Management Gateway
**Purpose #1: Data Refresh.**

*Referred to as enabling “cloud access”*

**Gateway:** Set up in Power BI Admin Center. Points to a server.

**Data Management Gateway:** Installed on-premises on the server. Uses key provided by the O365 Gateway.

**Data Source:** Set up in Power BI Admin Center. A virtual endpoint which refers to a database.
Purpose #2: OData Feeds. To expose an OData feed which can be consumed by Power Query. This is one way to share corporate data with business users.

For a table to “eligible” to be part of the OData feed, it must either have a Primary Key or one non-nullable column.
Whe is Data Mgmt Gateway Required?

**Cloud-Only Data Source:**

Data management gateway is **not required** for a single cloud source. It uses connection string stored in the workbook. *(Even the Azure VM.)*

**On-Premises data source(s):**

On-premises data sources do **require a data management gateway.** Credentials in PBI Admin Center take precedence over connection string.

**Multiple Cloud Sources or Cloud + On-Premises (Mashup):**

A mashup does **require a data management gateway** – the mashup operation needs an engine & the DMG provides this. So > 1 cloud source requires a DMG. Credentials in PBI Admin Center then take precedence.
On-Prem Data Refresh

The Administrator could extract the connection string from the workbook, but still wouldn’t see the user’s password…so the credentials in Power BI Admin Center will take precedence.

Workbooks A and B → Data Source 3
Workbook C → Data Source 1
Workbook D → Data Source 2
The following needs to match between what's defined in the workbook and what's defined in the Power BI Admin Center:

1. **Server name** matches between workbook and a Gateway in the Power BI Admin Center
2. **Database name** matches between workbook and a Data Source in the Power BI Admin Center (it is case sensitive!)
3. Same **provider** is used in the workbook and a data source in the Power BI Admin Center
   - Default in Admin Center: OLE DB
   - Default in Power Pivot: OLE DB if SQL not installed; else Native Client Provider
4. Access control list: user who is defining the data refresh has **permission** to the data source in Power BI Admin Center
   - Users and Groups page of Data Source definition

**Note the User ID and Password in the workbook connection are not one of the criteria for matching.**
Microsoft refers to this matching process as a “Discovery Process” which uses a virtual DNS to decouple the data source from its consumption. *

As of May 2014: 29% of issues/errors in the Power BI Admin Center are due to the matching process. *

The matching process has big implications if data coming out of the source is restricted by row-level-security.

* Source: Samuel Zhang presentation, 2014 PASS BA Conference
Scheduled Data Refresh Options (1/2)

- Options are **daily** or **weekly**
- Failure **notifications** can be sent, but not success notifications
- Time specified is “as close as possible to” – how close depends on “fair load distribution algorithms” used in the multi-tenant service
Scheduled Data Refresh Options

- Schedule will only go **90 days forward**
- An e-mail alert is sent to the notifications list one week prior to the end date (*this is usually the workbook owner not the administrator*)
- If you own many workbooks, to save time consider scheduling all to expire last day of the month
DATA CATALOG
Data Catalog

Includes two things to expose corporate data for Enterprise Data Search (aka Online Search): **Data Feeds** and **Shared Queries**
Online Search

Exposing Database Tables & Views:
Shared by the **Admin** with an OData feed in Power BI Admin Center (Data Source)

Shared Queries:
Shared by **User** within Power Query
WRAP UP

&

QUESTIONS
Additional Details

Power BI Security Overview
http://www.sqlchick.com/entries/2014/6/8/power-bi-security-overview

Data Source “Matching Process”

When Is a Data Management Gateway Needed in Power BI?

Differences Between Power BI and SharePoint BI

Click-To-Run (Streaming) Version of Office

Ways to View Content Published to a Power BI Site
Thanks for attending!

Slides at sqlchick.com (Presentations & Downloads page)

Session Evaluations:

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