

---

# Power BI Data Security

Steve Hughes

Director of Consulting

[shughes@pragmaticworks.com](mailto:shughes@pragmaticworks.com)

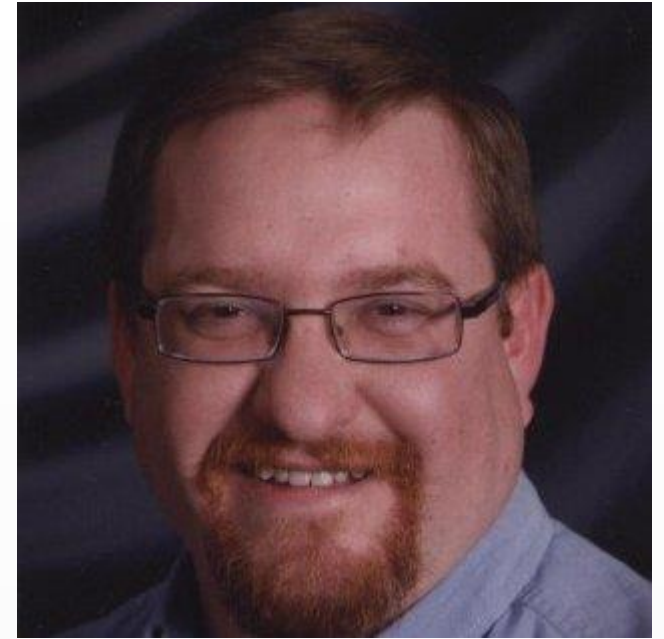


---

# Something about me...

- At Pragmatic Works for over 4 years
- Nearly 20 years working with SQL Server, BI, and Azure solutions
  
- Email: [shughes@pragmaticworks.com](mailto:shughes@pragmaticworks.com)
- Blog: [www.dataonwheels.com](http://www.dataonwheels.com)
- Linked In:  
<https://www.linkedin.com/in/dataonwheels>

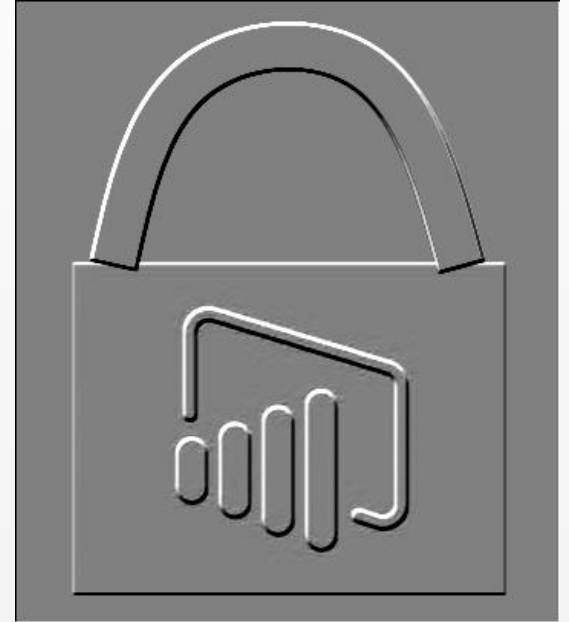
Connect with me



---

# Common Security Concerns

- Can I trust the cloud? Can I trust Azure?
- Who owns my data and access to it?
- Does a hybrid scenario expose my datacenter?
- Who can publish data to the cloud?



# Data Compliance and Security in Power BI



# Compliance



HIPAA/HITECH



EU Model Clauses



ISO/IEC 27001



ISO/IEC 27018



GOV.UK

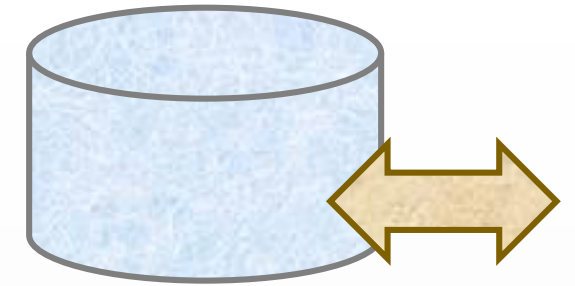
UK G-Cloud

## Microsoft Trust Center

# Encryption

## Data at Rest

Data Source	Metadata	Data
Live Connection (Analysis Services)	Nothing stored except database name encrypted in Azure SQL DB	Nothing Stored
Direct Query (SQL Server, Oracle, etc.)	Encrypted in Azure Blob Storage	Nothing Stored
Pushed or streamed data	Encrypted in Azure Blob Storage	Depending on version, encrypted in either Azure Blob Storage or Azure SQL Database
Data loaded into model (data may be refreshable or nonrefreshable)	Encrypted in Azure Blob Storage	Encrypted in Azure Blob Storage



## Data in Transit

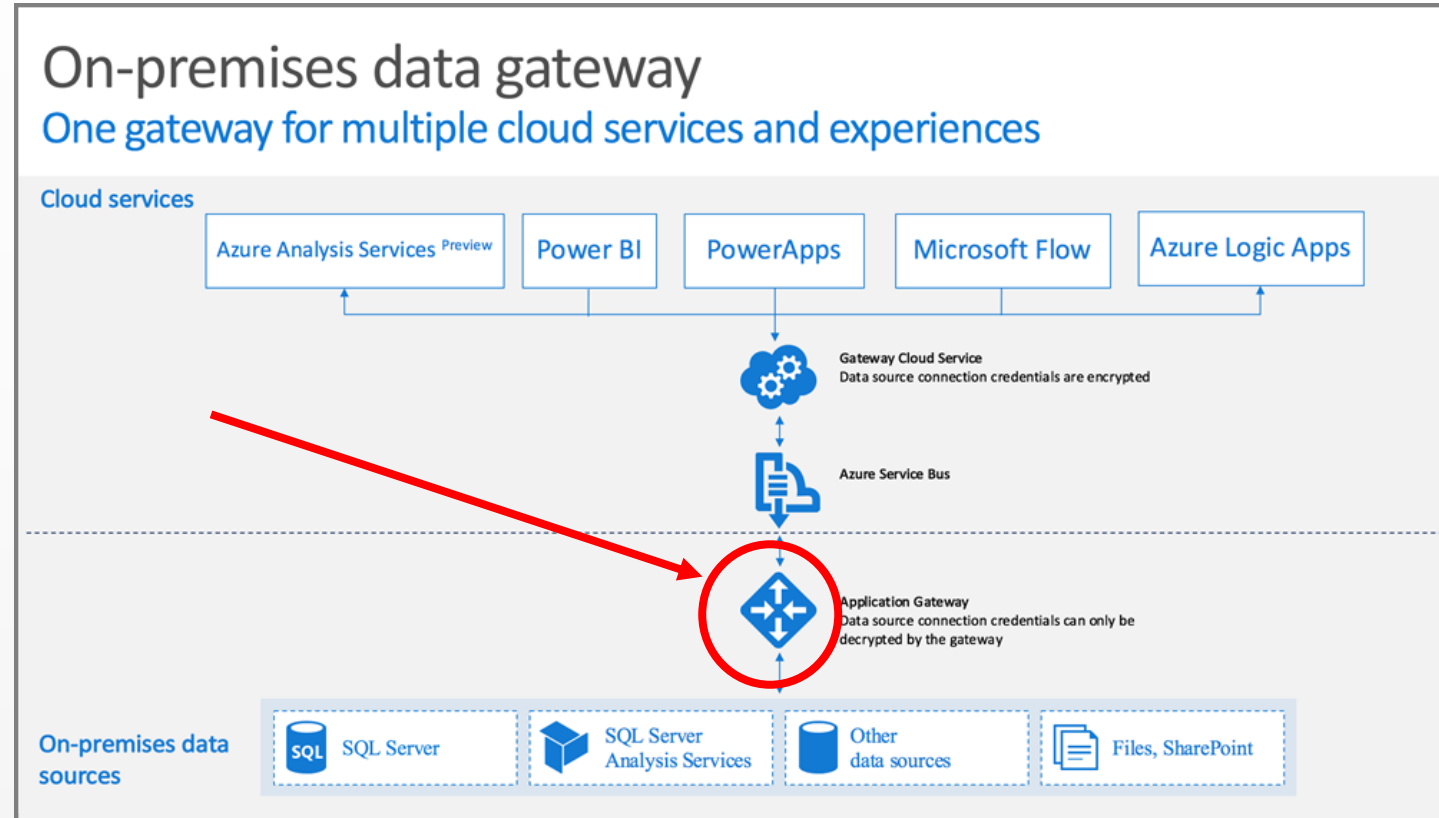
All data is encrypted using HTTPS to connect from the data source to the Power BI Service

## Data in Use

Data is cached for all connection types including DirectQuery  
Cached data is encrypted and stored in an Azure SQL Database

# On-premises Data Gateway

- All communication and data in transit is encrypted with HTTPS
- Data Source credentials encrypted in service, key maintained on-premises
- Outgoing ports only, gateway monitors service bus for requests
- No data is stored on the gateway and the gateway service account should not have access to data sources
- Gateway access is limited on the service



---

# Admin Portal and Tenant Settings

- Share content with external users
  - Recommend this is disabled
- Publish to web
  - Recommend this is disabled
- Export Data, Export to PowerPoint, Printing
  - Evaluate for you needed
- Create Workspaces
  - New workspaces experience controlled from here
- Allow external guest users to edit and manage content
  - Recommend this stay disabled without specific use case





---

# PSA: Admin Portal and Tenant Settings

- Share content with external users
  - **Recommend this is disabled**
- Publish to web
  - **Recommend this is disabled**
- Where to disable these features
  - They are on by default



---

# Row Level Security

- Row Level Security with Power BI
  - Works in Workspaces with members with read permissions only
  - Uses DAX expressions
  - Implemented in Power BI Desktop
- Row Level Security with Live Connections
  - SQL Server Analysis Services only
  - Uses EffectiveUserName through gateway
  - Data Source connections require Admin access in SSAS
- RLS is not supported in the new workspaces, more to come on that



# Collaboration and Data Security



---

# Power BI Apps & App Workspaces

- Supports shared development
- Supports staged deployment
- Apps keep the content organized together
- **Power BI Apps support deploying Read Only assets for distribution to Pro Users and Premium Users**



# Workspaces Old vs New

## “Old” Workspace

- Creates a matching Office 365 Group
- Only supports individual users
- Permissions Supported:
  - Admin
  - Member
    - Can edit content
    - Cannot edit content
- Supports RLS

## “New” Workspace

- No Office 365 Group created
- Uses individual users, security groups, and Office groups
- Three permission sets supported:
  - Admin
  - Contributor
  - Reader

## Both Workspaces

- Only are where content can be created
- Admin users set users and groups
- Workspaces are listed in Admin portal in Power BI

+ Create **Update app** ...  
 Files  
 Members  
 Calendar  
 Conversations  
**Edit workspace**  
 Leave workspace  
 Unpublish App

**Edit workspace**

Name

Data On Wheels Finance

Privacy

Private - Only approved members can see what's inside

Members can edit Power BI content

Workspace members

Enter email addresses

Add

shughes_pragmaticworks.com#ext#@...	Member	▼	🗑️
steve@dataonwheels.com	Admin	▼	🗑️

Advanced ▼

Delete workspace Save Cancel

+ Create Settings **Access** Publish app ...  
 Workspace settings  
**Workspace access**  
 Showing 0 items

**New**

**Access**  
SSRS Reports

Add admins, members or contributors. [Learn more](#)

Enter email addresses

Member ▼

Add

Search

NAME	PERMISSION	
Steve Hughes	Admin	...
Kristyna Hughes	Contributor	...
Joe Abbott	Member	...

**Old**

---

# Power BI Premium and Readonly Users

- Supports Readonly Using Apps
- Supports “unlimited” readonly, free users
- Contributors require Power BI Pro licenses
  
- Power BI Premium is “server based” thus providing additional security via physical separation of server assets.
  
- Entry level – P1 \$5000/month

---

# Groups, groups, groups

- Office 365 Supports 4 Types of Groups
  - Office 365 – recommended by Microsoft, not necessarily admins
    - Used with Power BI Workspaces
    - Pro users can create from Power BI
    - Managed by user membership, does not support other groups
  - Distribution List – email support
  - Mail-enabled Security Group – like a typical AD Group with an email
  - Security Group – a typical AD Group, no email



# Sharing Discussion

- Why share?
  - Not bound to workspace and app scope
  - One off scenarios, validation, testing
- Sharing cannot be prevented within your organization
  - Any pro user can share content
- Sharing can be turned off for sharing outside your organization

Share report  
DIAD- REPORT FINAL

Share Access

Only users with Power BI Pro will have access to this report. Recipients will have the same access as you unless row-level security on the dataset further restricts them. [Learn more](#)

Grant access to

Steve Hughes X Enter email addresses

Include an optional message...

Allow recipients to share your report

Send email notification to recipients

Report Link ⓘ

<https://app.powerbi.com/groups/me/reports/6a4daee0-4846-4f...>

Share

Share report  
DIAD- REPORT FINAL

Share Access

The following have access to this report

Search

NAME	ACCESS
Data On Wheels Finance	Owner
Steve Hughes	Read and reshare

Read and reshare

Read

Read and reshare

Remove access

Manage permissions

Cancel

# Limiting the Share

- Sharing Options
  - Read
  - Read and Reshare (Default)
  - Owner
- Apply filters and slicers to Share
  - Generates report link
  - Valid for 90 days
  - **Filters can be changed, not a security option**

- Allow recipients to share your report
- Send email notification to recipients
- Share report with current filters and slicers

Report link ⓘ

<https://app.powerbi.com/groups/me/reports/cbcf397a-d475-4f25-9565-fb278cf>

## Share report

DIAD- REPORT FINAL

Share Access

The following have access to this report

Search

NAME	ACCESS	
Steve Hughes	Owner	
Tasha Sulek	Read	... Guest
Steve Hughes	Read and reshare	... Guest
Alexander Hughes	Read and reshare	...

Manage permissions

Manage shared report views

Manage permissions

Manage shared report views

---

# Guest Users, Email, Sharing “outside the walls”

- **Guest Users creation can be limited in Power BI Tenant Settings, Office 365 Security Settings, and Azure Active Directory Settings**
- **Email sharing “Share your Power BI content with anyone by email”**
  - Done the same way as normal sharing
  - Email can be personal (e.g. @gmail.com) or a different organization
  - Power BI Apps can be shared the same way
  - **If you allow Power BI Pro users to share this way, you are giving them permission to create guest accounts in Azure Active Directory**
- **With the new workspaces and the “Allow external guest users to edit and manage content” turned on, Guest users can:**
  - **Add content to the workspace**
  - **Be an Admin of the workspace**

# Auditing and Logging



---

# Auditing Power BI

- Dashboard Usage Metrics
  - Newly released
  - Dashboard view
  - 90 days of data
  - Up to 24 hour lag in data
  - Available to the report designers
  - Views, viewers, shares
  - Customizable options
- Usage Metrics in Admin Portal
  - Subscription view
  - Only available to Power BI Admins
  - Users, groups, assets
  - Fixed view

---

# Audit Logs in Office 365

- Some of the 91 Power BI Activities Logged

- Viewed Power BI Dashboard
- Edited Power BI Dashboard
- Shared Power BI Dashboard
- Created Power BI Dashboard
- Deleted Power BI Dashboard
- Printed Power BI Dashboard
- Exported Power BI tile data
- **Viewed Power BI Report**
- Deleted Power BI Report
- Printed Power BI Report Page
- Analyzed Power BI dataset

- Downloaded Power BI Report
- Exported Power BI report visual data
- Published Power BI Report
- Deleted Power BI datasets
- Created Power BI Group
- Added Power BI Group members
- Created organizational content pack
- Updated organization's Power BI settings
- Started Power BI trial
- Started Power BI extended trial

# Sample Log Content

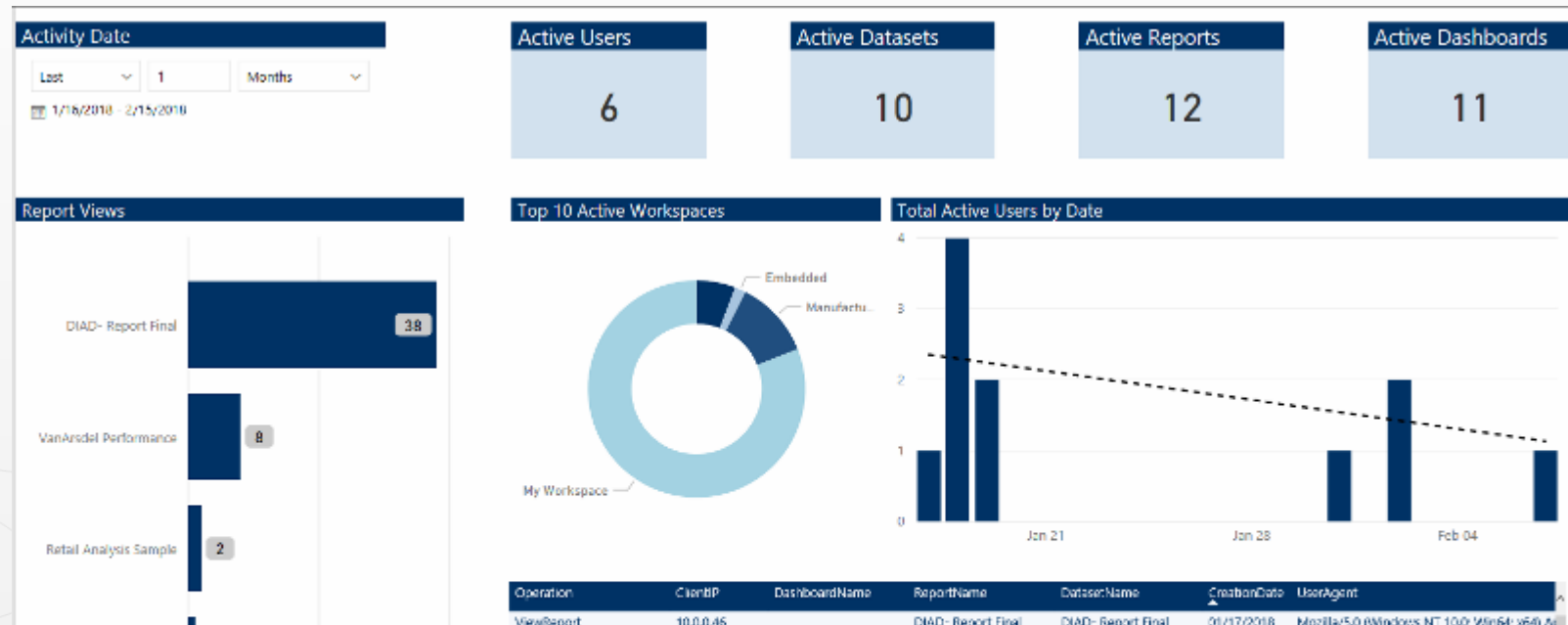
- Parameters
  - Activities: “Created Power BI Dashboards”
  - Date Range: 5/1/17 to 6/11/17
  - Users: not set
  - File, folder, or site: not used

Results 4 results found Filter results Export results

Date ▾	IP address	User	Activity	Item	Detail
2017-06-08 10:29:14	174.30.246.192	<a href="mailto:steve@dataonwheels.com">steve@dataonwheels.com</a>	Created Power BI dashboard	Power BI Mapping Dashboard	
2017-05-19 13:43:23	167.220.152.7	<a href="mailto:mike.dostal@dataonwheels.com">mike.dostal@dataonwheels.com</a>	Created Power BI dashboard	.VanArsdel With RLS	
2017-05-09 11:14:54	63.239.226.253	<a href="mailto:steve@dataonwheels.com">steve@dataonwheels.com</a>	Created Power BI dashboard	.VanArsdel2	
2017-05-09 11:14:54	63.239.226.253	<a href="mailto:steve@dataonwheels.com">steve@dataonwheels.com</a>	Created Power BI dashboard	.VanArsdel2	

# Power BI Audit Log Analytics Solution

- Steve Howard, @AngryAnalytics, Microsoft TSP
- Powershell -> CSV -> Power BI solution
- Republished with permission
  - <https://dataonwheels.wordpress.com/2018/05/24/power-bi-and-data-security-audit-logs-powershell-power-bi-and-angryanalytics/>





# Report Usage

- Content creators can see report and dashboard usage metrics

## Dashboard Usage Metrics

This report is automatically generated by Power BI to provide usage metrics for your dashboard. Usage data is retained for the last 90 days. Changes to your dashboard may take up to 24 hours to appear here. [Learn more](#)

### Distribution methods

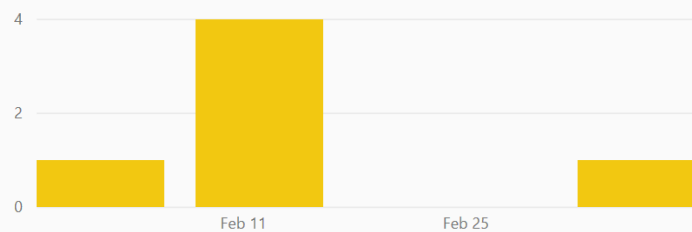
All

The Distribution Method slicer allows you to slice based on how the user obtained access to this dashboard. [Learn more](#)

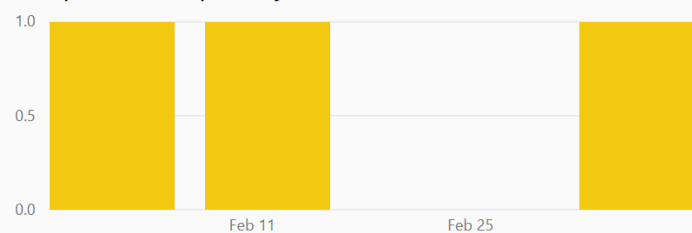
### Platforms

All

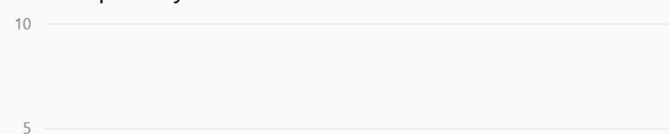
### Views per day



### Unique viewers per day



### Shares per day



Total views: 6  
Total viewers: 1  
Total shares: (Blank)

Rank is calculated by comparing this dashboard against other dashboards in your organization. [Learn more](#)

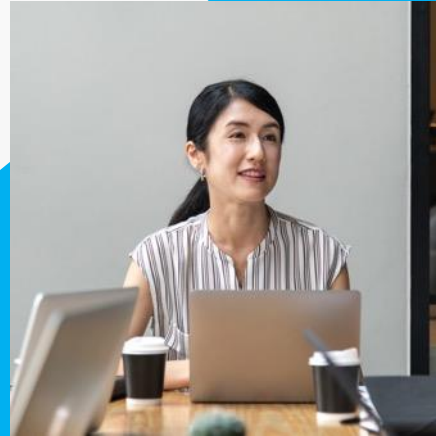
Total views rank: 2  
Total shares rank: 1

Total Dashboards in Organization: 14

### Views by user

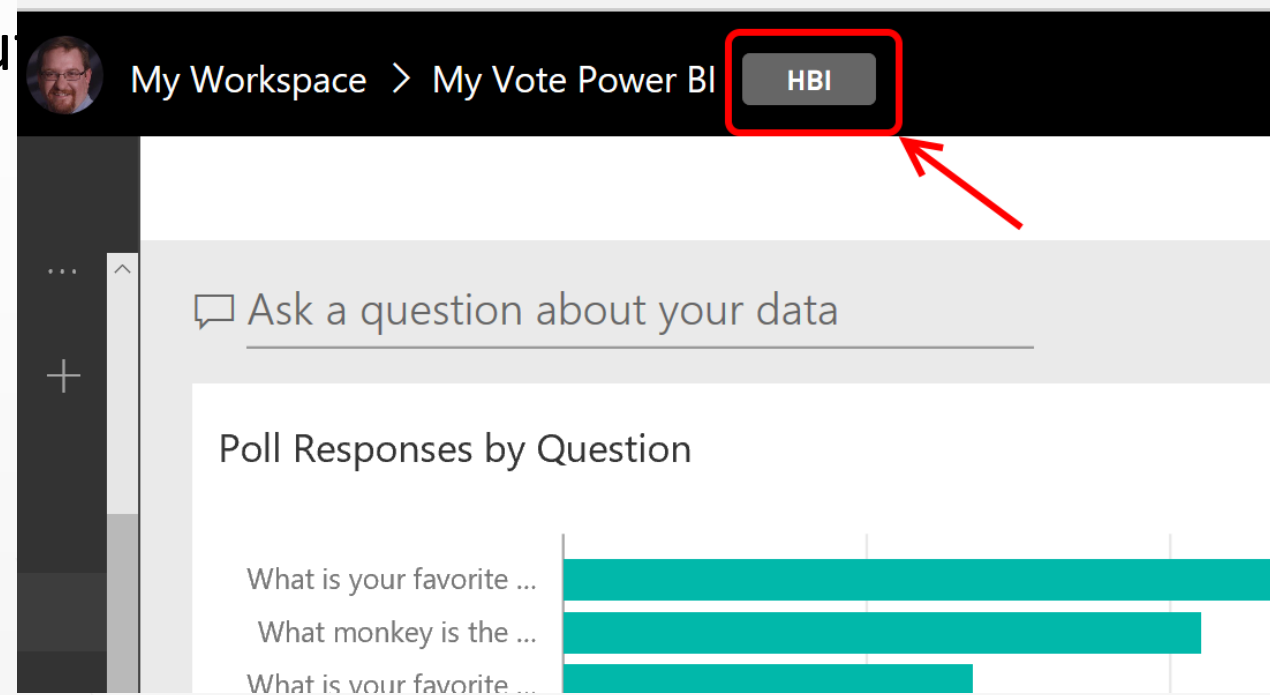
Family Name	Given Name	User Principal Name	Views
Hughes	Steve	steve@dataonwheels.com	6

# Classification and Dataflows



# Data Classification

- Labeling not security
- Requires processes and rules, but
- Only on dashboards
- Set up in Tenant Settings



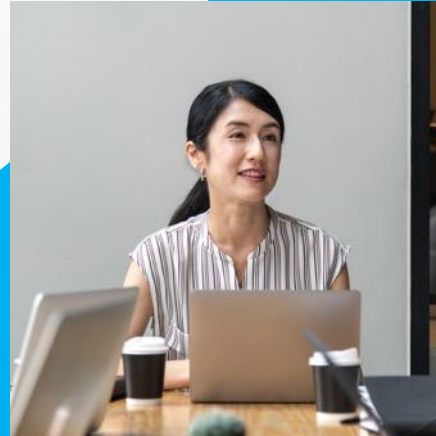
The screenshot shows a Power BI workspace interface. At the top, the breadcrumb navigation reads "My Workspace > My Vote Power BI". To the right of this, a grey button labeled "HBI" is highlighted with a red rectangular box. A red arrow points from the bottom right towards the "HBI" button. Below the navigation bar, there is a search bar with the placeholder text "Ask a question about your data". Underneath the search bar, a section titled "Poll Responses by Question" displays a horizontal bar chart with three teal bars of varying lengths. The questions listed on the left are "What is your favorite ...", "What monkey is the ...", and "What is your favorite ...".

---

# Dataflows

- “Power BI Storage”
  - Data is loaded here for ease of use by content creators
  - Uses Azure Data Lake Storage Gen 2
- Dataflow ownership and access
  - Only one owner, the creator
  - Content creators in the workspace containing the dataflow can use it as a data source
- Azure Data Lake integration is in preview
  - You will be able to store dataflows in your Azure Data Lake
- Expect more changes to come on this

# Wrap Up and Resources



---

# Wrap Up

- Power BI manages data security very well
- Power BI is continually improving (e.g. tenant settings were released early in 2017, Premium later in 2017, new workgroups in 2019)
- Most roadblocks to Power BI use are internal politics not real issues with Power BI
- Power BI is not perfect – still looking for that Read Only license

---

# Resources

- Steve Hughes
- shughes@pragmaticworks.com
- www.dataonwheels.com

- RESOURCES:
- [www.dataonwheels.com](http://www.dataonwheels.com) – Category: Power BI Data Security
  - <https://dataonwheels.wordpress.com/category/power-bi-data-security/>
  - 5 posts on Compliance and Encryption, Gateway, Sharing, Classification and Privacy Levels, and RLS
- Microsoft Trust Center - <https://www.microsoft.com/en-us/trustcenter>
  - Power BI Security - <https://powerbi.microsoft.com/en-us/documentation/powerbi-admin-power-bi-security/>
- [www.pragmaticworks.com](http://www.pragmaticworks.com)
  - Power BI Managed Services – Let us centralize your Power BI management
  - Power BI Consulting Services – We can build it with you
  - Power BI Training – Learn from us

