Dashboards in Power BI with Real-time* Data

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PASS SQLSATURDAY

Agenda

- Overview of Power BI
- Scenarios / Business Cases
- Streaming Options in Power BI
- Demo & QA

Overview of Power BI

- Software As A Service (SaaS), 2nd in its kind
- Central Reporting under 1 Umbrella
- Supports Self-Service BI + Paginated Reports
- Seamless integration (Keep expanding horizons)
- Available any Platform, Any device
- Cloud & On-Premise versions

- Find out more: https://powerbi.microsoft.com/en-us/
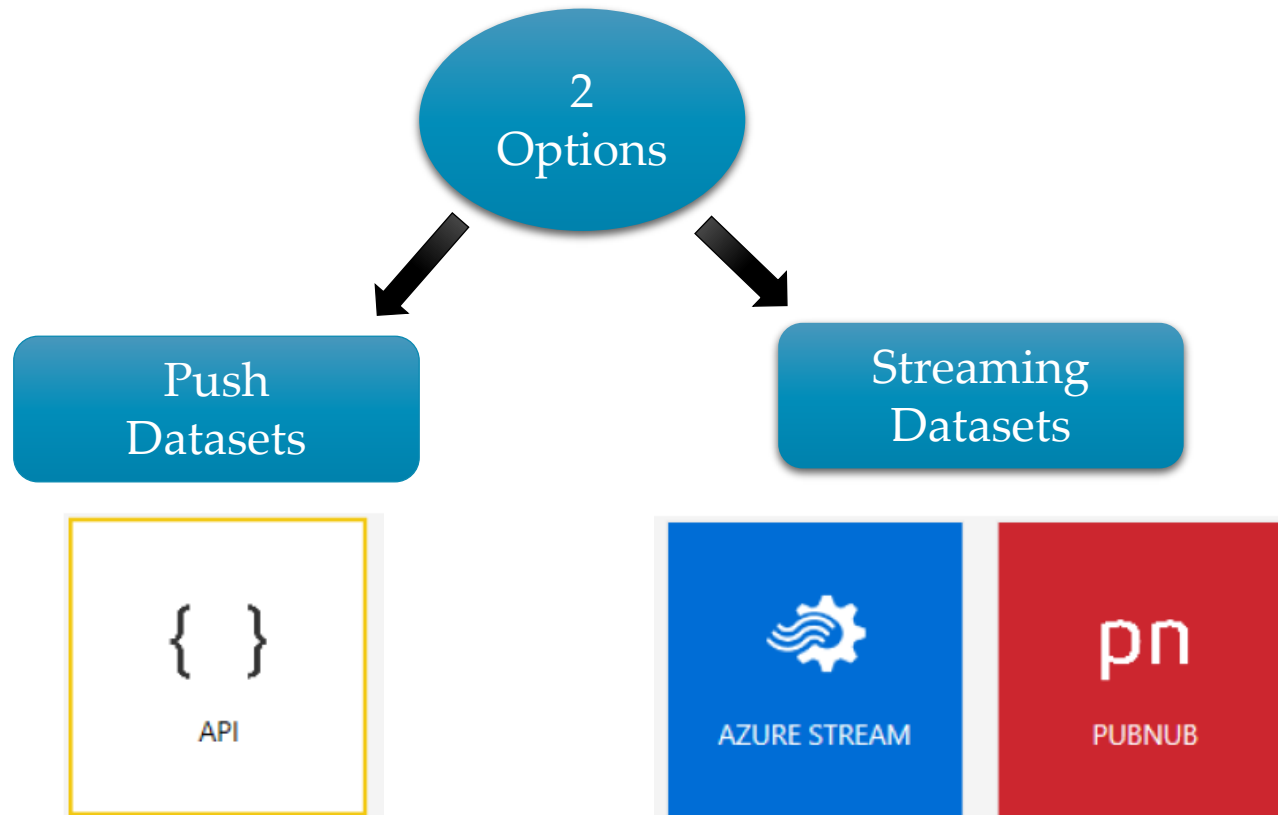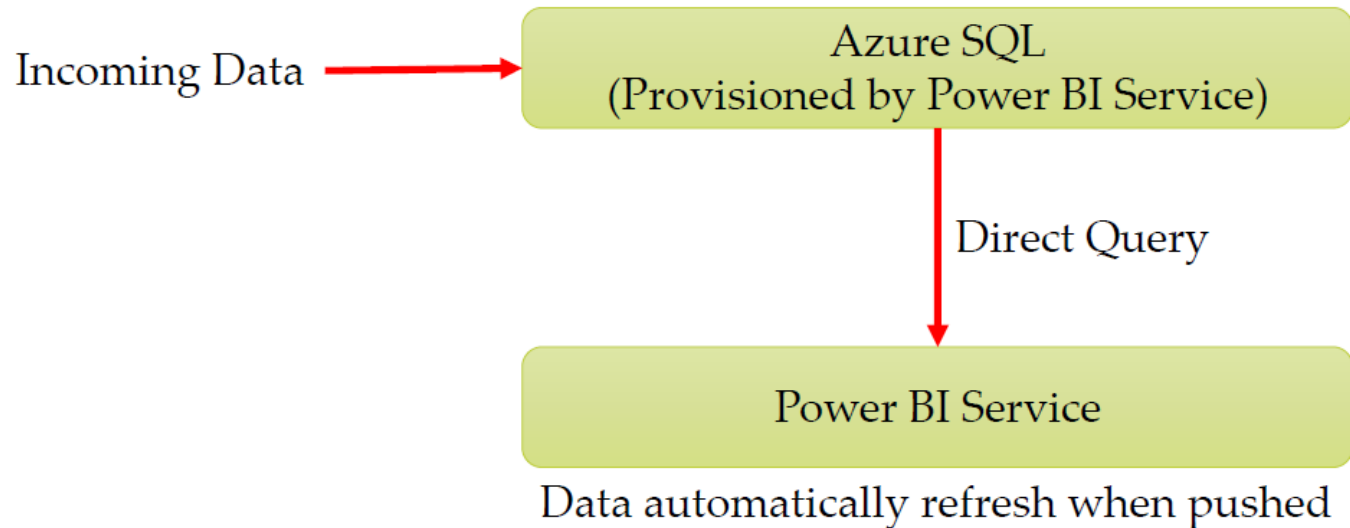
Scenarios / Cases for Real-time*

- Monitoring (e.g. Infra support team, Supply Chain)
- Engagement (e.g. Offers Mgmt. in Service Sector - Hotels)
- Action (e.g. Fraud detection, Hacking, IoT – earth quake)
- Optimization (e.g. System testing, Scientific research)
- More…

- Or your Boss asked for it

Streaming Options in Power BI

Push

Incoming Data →

Azure SQL
(Provisioned by Power BI Service)

Direct Query

Power BI Service

Data automatically refresh when pushed

Advantages
- Its Direct Query
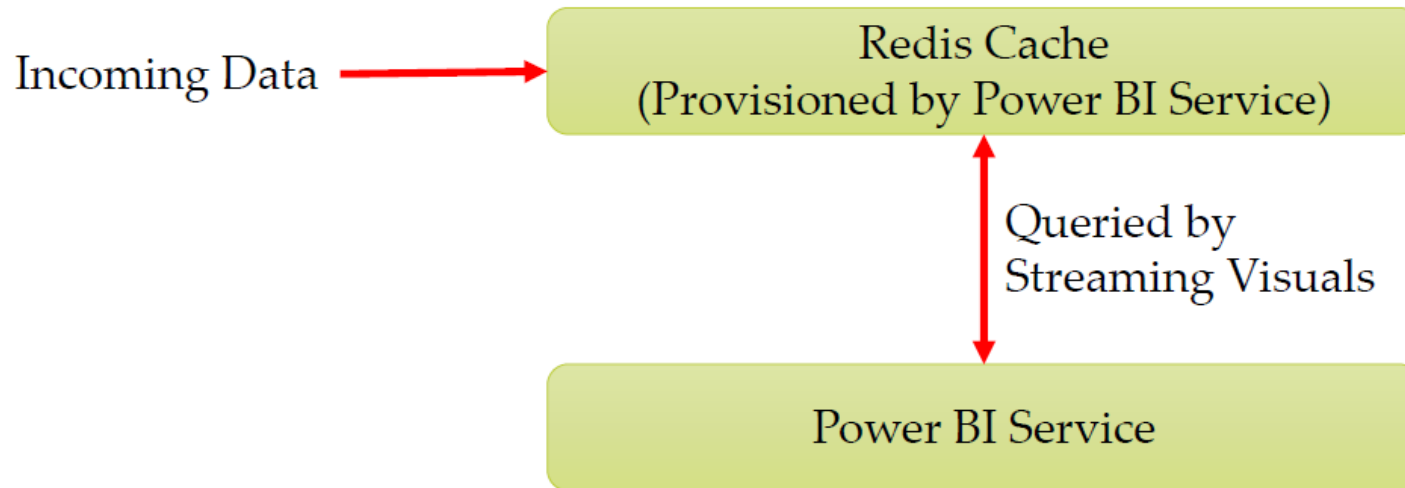- Can build reports, custom visuals, Q & A, alerts etc.

Caveats
- Slower refresh times
- API throttling limitations

When should we use ?
- General purpose
- ~3-5 seconds latency accepted

https://docs.microsoft.com/en-us/power-bi/developer/api-rest-api-limitations

Azure Stream

Incoming Data ⟶

Redis Cache
(Provisioned by Power BI Service)

Queried by
Streaming Visuals

Power BI Service

- Data goes into short-lived –Redis Cache store
- Power BI connects to Redis Cache when Streaming Visual is active on Dashboard

Advantages
- Very quick refreshes (~ 1 Sec)
- Visuals optimized for real-time refresh scenarios
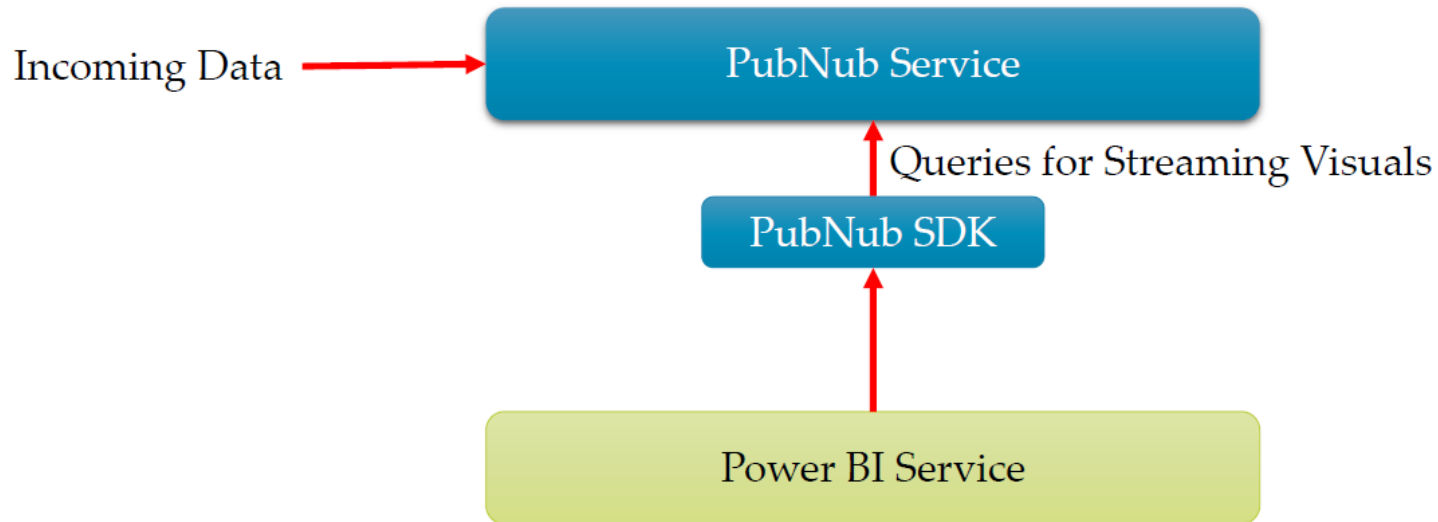- Easy to build and integrate in Dashboard

Caveats
- Limited set of Visuals for Dashboard
- Good panning is required

When should we use ?
- Absolutely need "Latest" data (up-to-date data)

PubNub

Incoming Data → PubNub Service

Queries for Streaming Visuals

PubNub SDK

Power BI Service

- 70+ SDKs are available (https://www.pubnub.com/docs)
- Power BI requests data from an existing PubNub Stream (https://www.pubnub.com/)

Advantages
- Very quick refreshes (~ 1 Sec)
- Visuals optimized for real-time refresh scenarios
- Easy to build and integrate in Dashboard

Caveats
- Limited set of Visuals for Dashboard (data lives @ PubNub)
- Can not create visual from Data directly
- Good panning is required

When should we use ?
- Absolutely need "Latest" data (up-to-date data)

Capability Matrix

Capability	Push	Streaming	PubNub
Dashboard tiles update in real-time as data is pushed in	**Yes.** For visuals built via reports and then pinned to dashboard.	**Yes.** For custom streaming tiles added directly to the dashboard.	**Yes.** For custom streaming tiles added directly to the dashboard.
Dashboard tiles update with smooth animations	**No.**	**Yes.**	**Yes.**
Data stored permanently in Power BI for historic analysis	**Yes.**	**No.** Data is temporarily stored for one hour to render visuals.	**No.**
Build Power BI Reports atop the data	**Yes.**	**No.**	**No.**
Max rate of data ingestion.	**1 request/s 16 MB/request**	**5 request/s 15 KB/request**	**N/A** Data is not being pushed into Power BI
Limits on data throughput	**1M rows/hour**	None.	**N/A** Data is not being pushed into Power BI

Before you start – Keep in mind

- Reduce to data volume down to only what you need to display on Dashboard

- For any deeper analysis/operations, store into Database, connect Power BI via import/live connection

- Be aware of data volume limits (more on REST APIs)

- Select proper columns for display on Dashboard

- More: https://docs.microsoft.com/en-us/power-bi/service-real-time-streaming#using-power-bi-rest-apis-to-push-data

DEMO TIME ☺

Helpful Resources

- https://docs.microsoft.com/en-us/power-bi/service-real-time-streaming

- https://www.youtube.com/watch?v=0YIBHfgasok

- https://www.pubnub.com/tutorials/microsoft-power-bi/streaming-business-data-to-dashboards/

- https://blog.jongallant.com/2016/06/iot-dashboard-azure-iot-hub-powerbi/

Thank you

Enjoy rest of the Event,
Have a great weekend