



Power BI Embedded

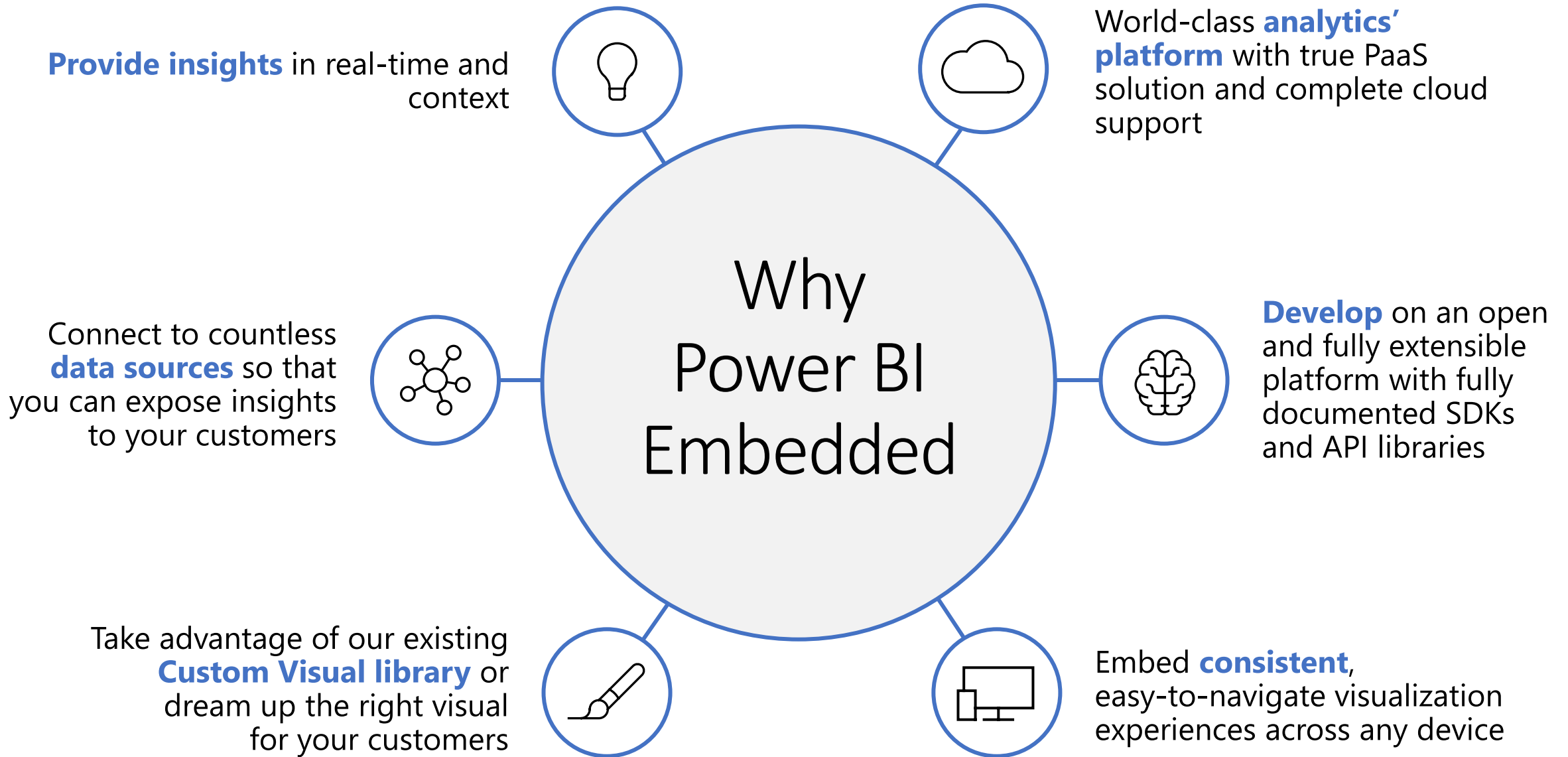
Just Thorning Blindbæk

Microsoft BI Consultant



Session objectives and takeaways

- Why embed
- Embedding options
- Get started
- Authorization and security
- Licensing



What can be embedded?

- **Reports**

- View—edit or create
- Fully interactive

- **Report visuals**

- View
- Fully interactive

- **Dashboards**

- View—any interaction must be developed
- Real-time dashboards

- **Dashboard tiles**

- View—but no interaction
- No support for real-time tiles

- **Q&A experience**

- Can be interactive (like in service), or
- Visual response only

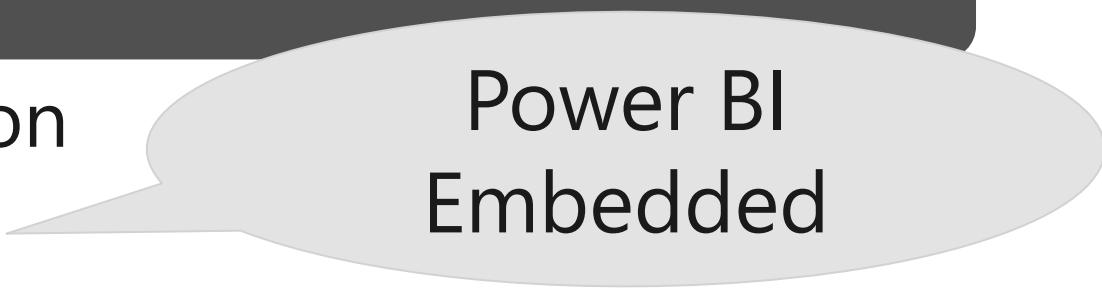
Embedding options

Publish to web

SharePoint Online Web Part

REST API / Custom development

- Embedding for your organization
- Embedding for your customers



Power BI
Embedded

Embedding scenarios – Internal App

Also known as

- User owns data
- Embedding for your organization

Extend the Power BI service

- Embed into a custom UX

Supports single sign-on (SSO) and row-level security

Capacity not required

Embedding scenarios – External App

Also known as

- App owns data
- Embedding for your customers

App authenticates users with its own identity store

App users do not require a Power BI account

Supports row-level security

Suitable for external customers and business partners

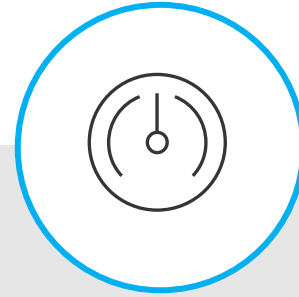
Capacity **required** for production

Power BI Embedded Pillars



Embed

Seamlessly embed Power BI into your application, including all reporting capabilities, natural language support and self-service BI



Automate

Automating enterprise and multi tenant apps scenarios
Azure elasticity

Embed

- Provide friction-free authentication and authorization experiences
- Embed using the extensive library of APIs and SDKs
- Get your users more engaged by interacting with Analytics



Latest JavaScript API capabilities

Visual embedding + custom layout

Scenario

ISV wants to embed visuals in his app, and have the ability to optimize size and location.

Enabled capabilities

- Show/ hide specific visuals in a page.
- Set their size and location in real-time.
- Update visibility and sizes during session.
- Visuals level API



Mobile support

Scenario

ISV wants to embed reports on his mobile app, and give his users a better experience when engaging with reports.

Enabled capabilities

- Embed report pages in mobile layout
- Support 'Swipe' & 'Zoom' events



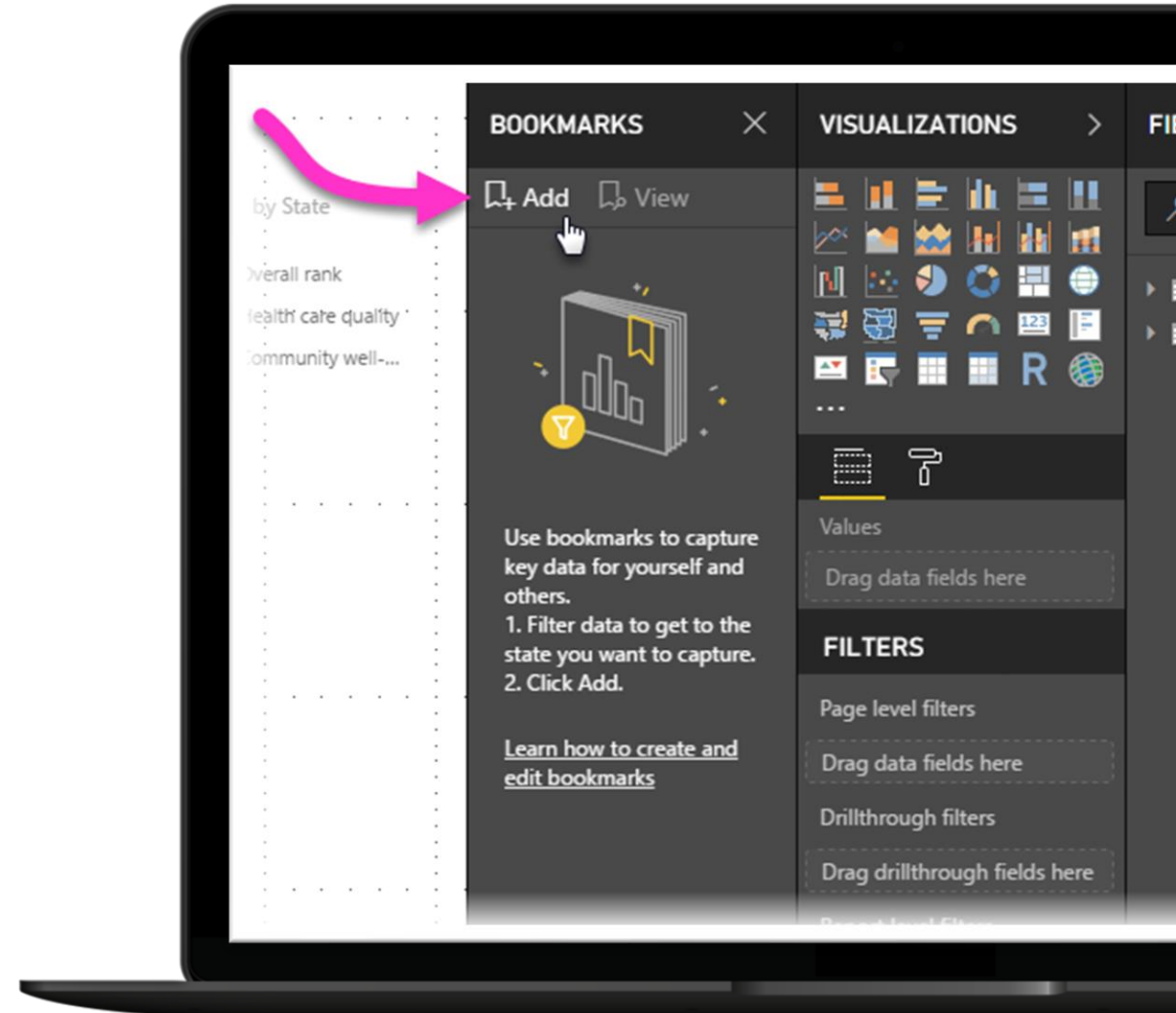
Bookmarks API

Scenario

ISV wants to use bookmarks on his embedded reports.

Enabled capabilities

- Get bookmarks list
- Apply bookmarks – on load, during session
- Show/Hide/ Nav pane
- 'Bookmark applied' event
- Capture state as bookmark (Personalization)



Demo

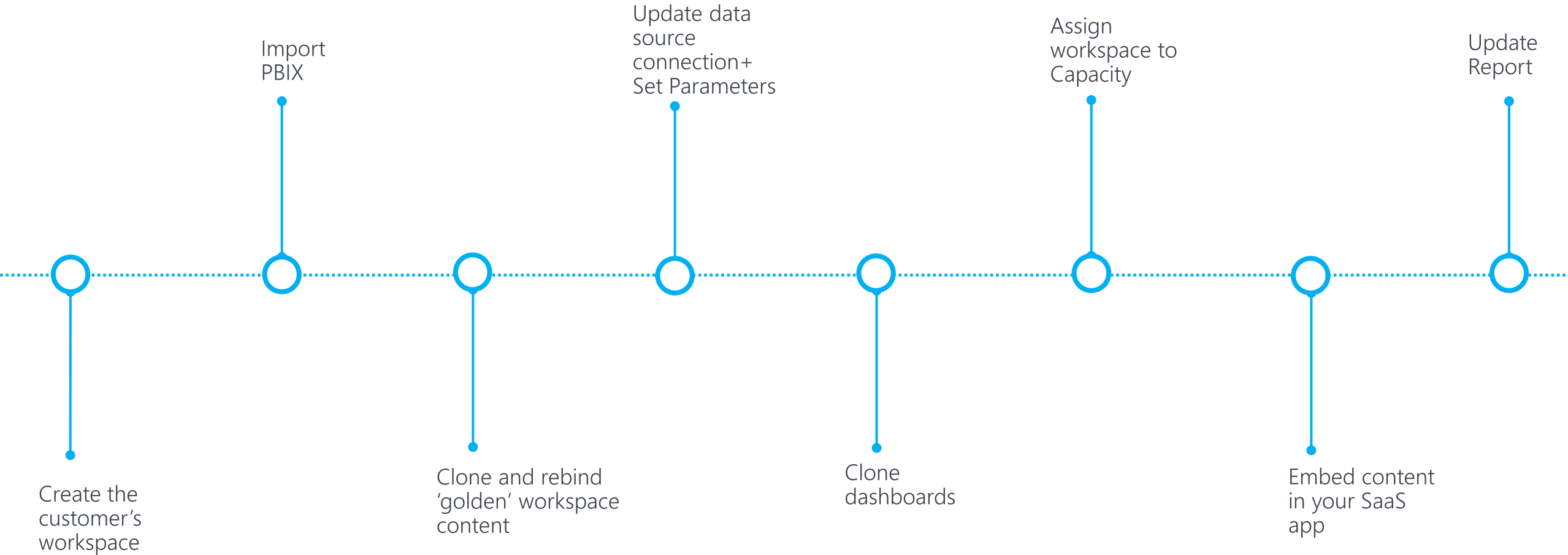
Microsoft Power BI Embedded Playground

Automate

- Use any of the 75 data connectors for Power BI
- Simplified new tenant onboarding
- Automated Azure Resource management



Automate – ALM APIs



Once your 'golden analytical content' workspace is available

Power BI Embedded in Azure

- Management of your capacities (create, delete, update, pause, resume).
- Metrics
- Alerts
- Diagnostics (coming soon)
- Billing information

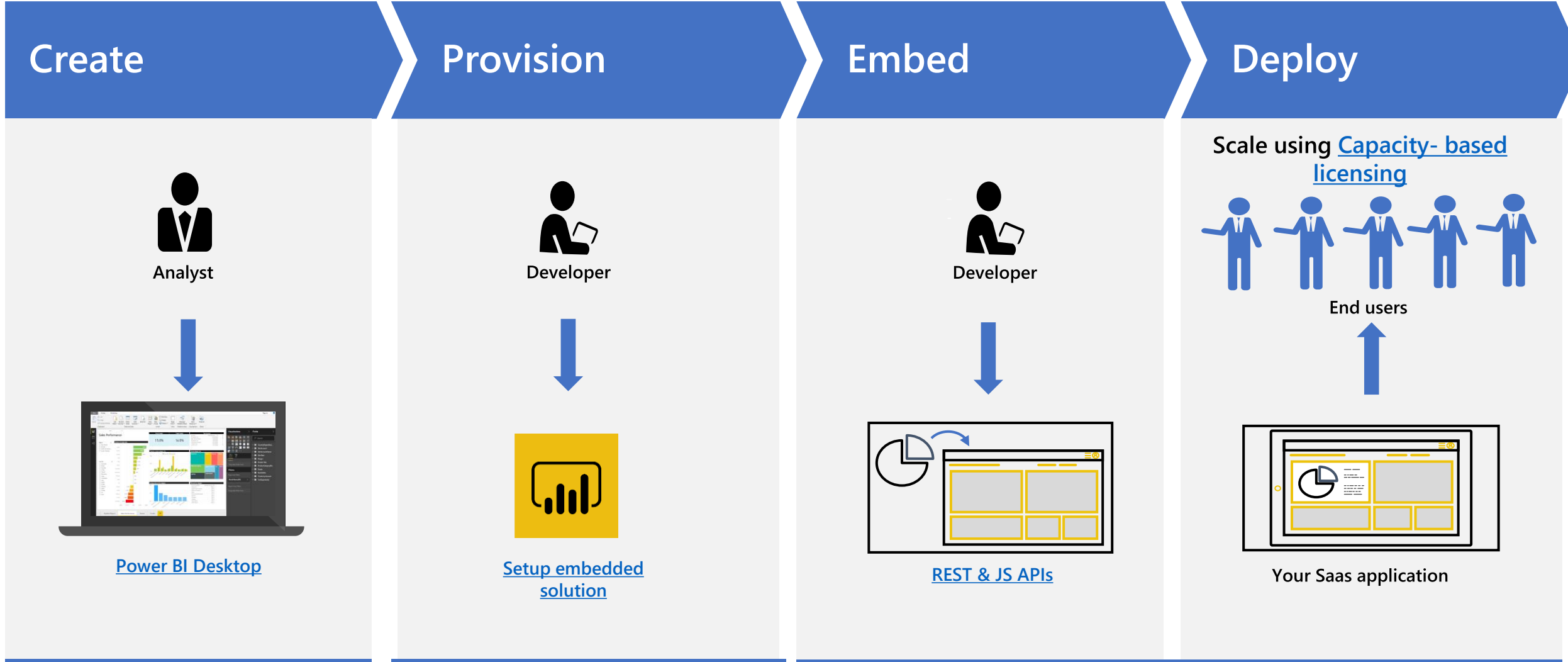
Demo

Power BI Embedded in Azure

Get Started with Power BI Embedded



How to start with Power BI Embedded?



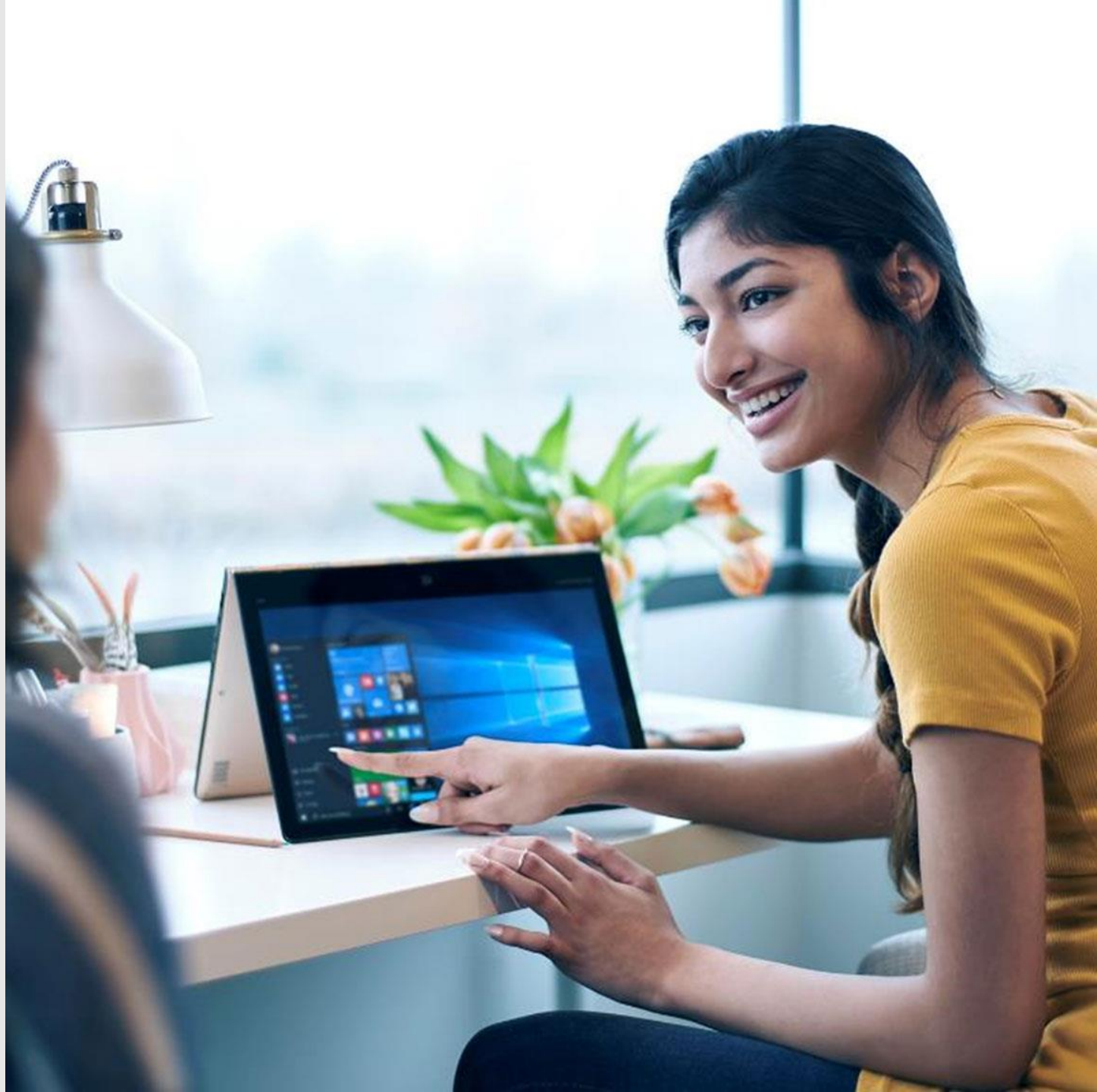
Developing your app

1. Create app workspace
2. Add Power BI content
3. Register application in Azure AD
4. Import NuGet packages
5. Add app settings
6. Develop Web UX
7. Enhance Web UX

Demo

New setup page

Authorization and security



Authorization pattern

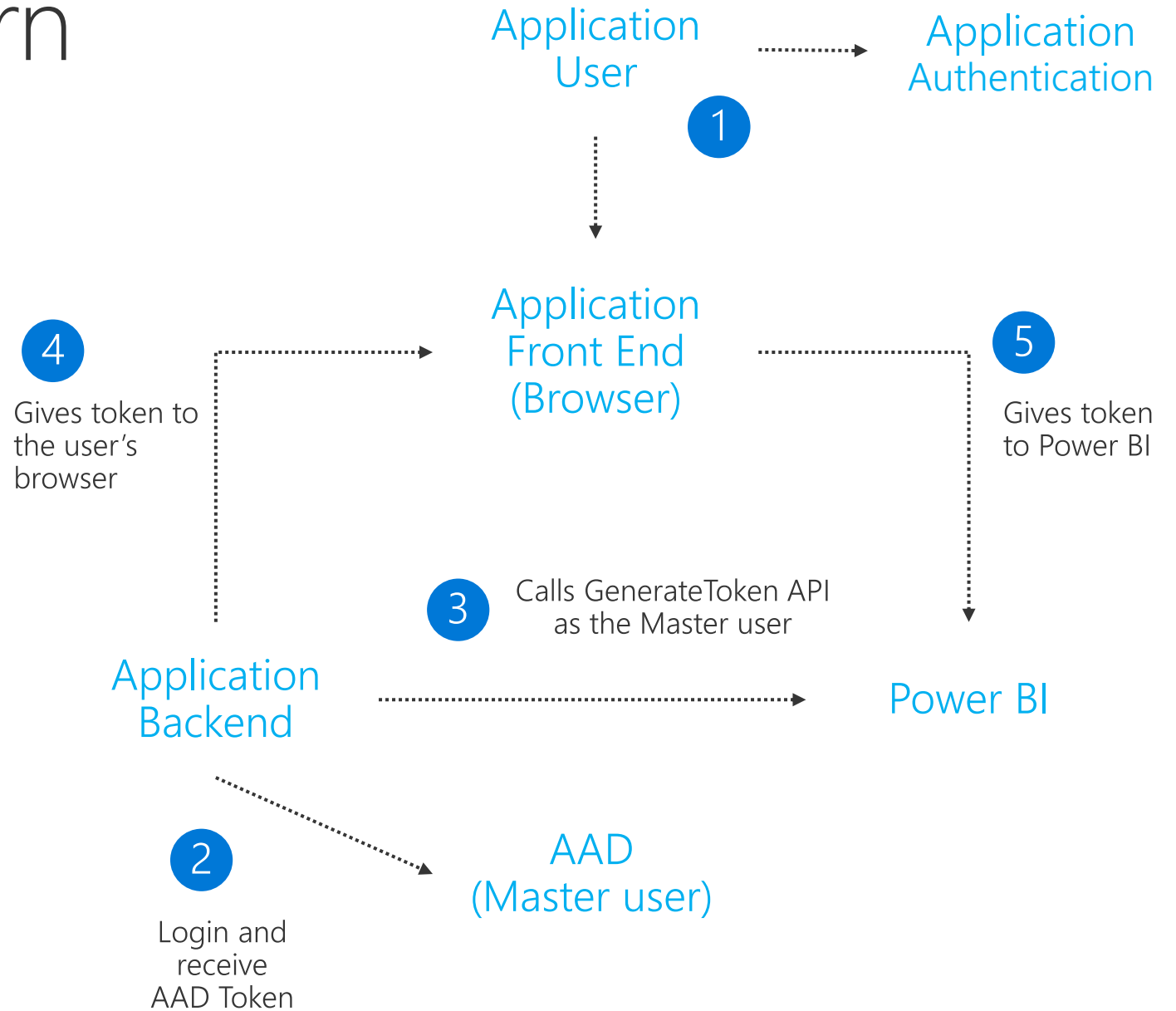
Access to Power BI is through a "Master Account"

- AAD Account **internal** to your application
- Has a **Power BI Pro** license
- **Owns** the App Workspace where content is stored

Application is responsible for Authenticating the user

- Can use any authentication method

Application authorizes access to Power BI using token created with the GenerateToken API



Tokens

Auth Token

Embed Token

Auth token

- Authenticating to the Azure Active Directory Tenant
- Account has to have a Power BI license
- Requires registered App
 - Application ID (also called Client ID)
- Can be done with REST API (2-step process)
 - Request Authorization code
 - Request access token

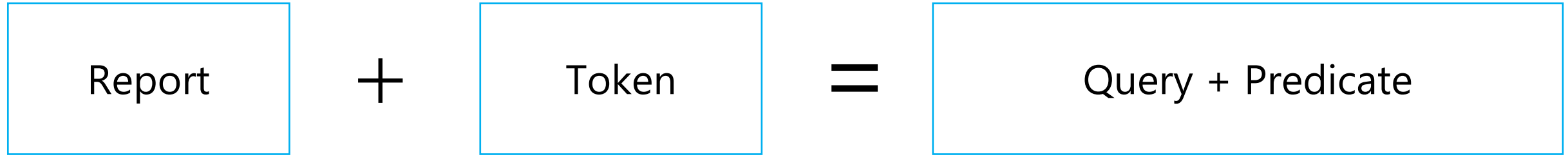
Embed Token

- Power BI token
- Created with Auth Token
- GenerateToken() in Power BI REST API
- Token determines
 - Which resource can be accessed
 - Access level
 - How long it can be accessed
 - Identities information for Row-Level Security (RLS)
- Application can silently refresh embed token when it expires



One token per
piece of content

Row - level security



Defines Roles
Roles define predicates

Asserts Role Membership
Asserts Identity

Query executes with correct scope

Ex.1

Role: Fabrikam
Predicate: [Company] = "Fabrikam"

roles: "Fabrikam"

Select * FROM [Sales] WHERE [Company] = "Fabrikam"

Ex. 2^{*}

Role: Company
Predicate: [Company] = USERNAME()

roles: "Company"
username: "Fabrikam"

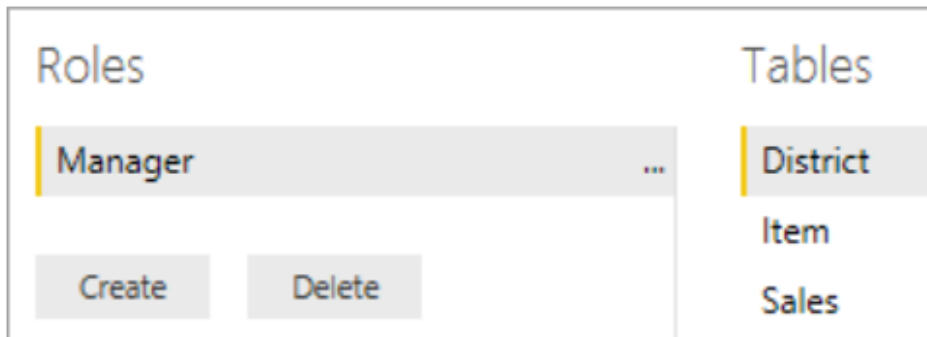
SELECT * FROM [Sales] WHERE [Company] = "Fabrikam"

Define roles on Power BI desktop

1. Go to 'Manage Roles'



2. Create a new 'Role' and define the rule



Demo

SEGES / Arlagården Plus

Capacity

	A SKU	EM SKU	P SKU
Product	Power BI Embedded	Power BI Premium	Power BI Premium
Purchase	Azure portal	Office 365	Office 365
Use cases	<ul style="list-style-type: none">• Embed content in apps	<ul style="list-style-type: none">• Embed content in apps• Share content with Power BI free users outside the Power BI portal• Embed in other SaaS apps (SharePoint, Teams)	<ul style="list-style-type: none">• Same as EM SKU, plus:• Share content with Power BI free users through the Power BI portal
Billing	Hourly	Monthly	Monthly
Commitment	None	Yearly	Monthly/Yearly
Difference	Full elasticity: scale up, scale down, pause, resume. ARM API with PowerShell.	Can be used to embed content in SharePoint Online and Microsoft Teams	Combine embedding in apps, and use the Power BI Service in the same capacity. Power BI Report Server included.

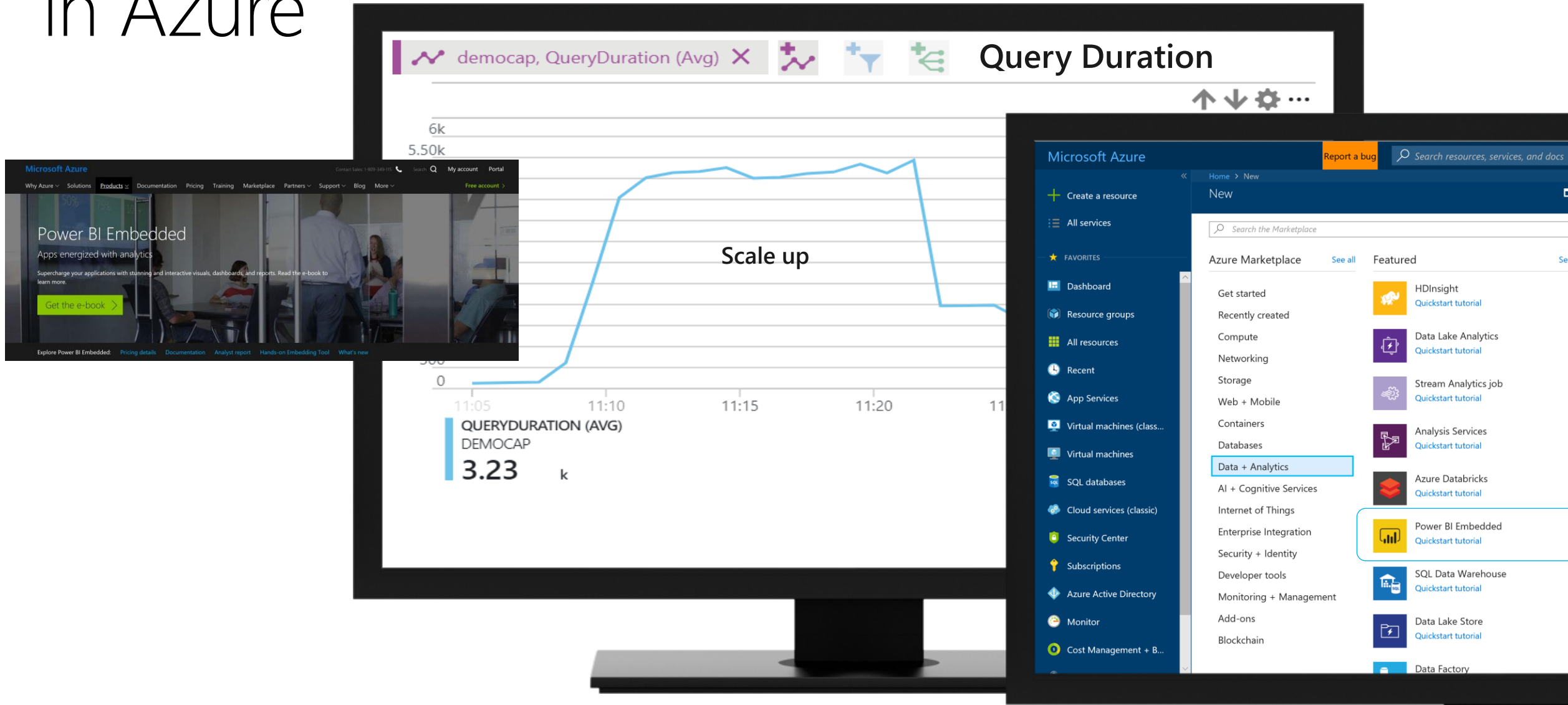


Licensing – external embedding

Pricing starts at \$750/month, or about a \$1/hour

Nodetype	Virtual Cores	Memory	Peak Renders per time	Pris per time	Pris per måned
Embedded A1	1	3 GB RAM	1–300	Kr. 6,34	Kr. 4.631
Embedded A2	2	5 GB RAM	301–600	Kr. 12,64	Kr. 9.226
Embedded A3	4	10 GB RAM	601–1,200	Kr. 25,33	Kr. 18.488
Embedded A4	8	25 GB RAM	1,201–2,400	Kr. 50,70	Kr. 37.013
Embedded A5	16	50 GB RAM	2,401–4,800	Kr. 101,46	Kr. 74.063
Embedded A6	32	100 GB RAM	4,801–9,600	Kr. 202,97	Kr. 148.165

Power BI Embedded is a PaaS resource in Azure



Roadmap (3-6 months)

- App Token authentication
- Azure Diagnostics
- Multi- geo support
- Visual dynamic configuration
- Themes API
- New Developer portal & Setup experience

Developer resources

Developer docs

<https://powerbi.microsoft.com/en-us/documentation/powerbi-developer-embedding/>

App Samples

<https://github.com/microsoft/powerbi-developer-samples>

Live JS Sample

<https://aka.ms/pbijs>

Power BI REST API

<https://msdn.microsoft.com/en-us/library/mt147898.aspx>

Power BI JavaScript

<https://github.com/Microsoft/PowerBI-JavaScript/wiki>

Azure Capacity PS

<https://docs.microsoft.com/en-us/powershell/module/azurerm.powerbiembedded/?view=azurerm-ps-5.4.0>

Ask us questions

<https://community.powerbi.com/t5/Developer/bd-p/Developer>