

Connecting to Dataverse: do's, don'ts and how not to make all your data public by accident

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Started with BC

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 Business Applications MVP

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 Cloud Solution Architect @ Qubix

 Business Applications & M365 Development MVP

 blog.yannickreekmans.be

 @YannickReekmans



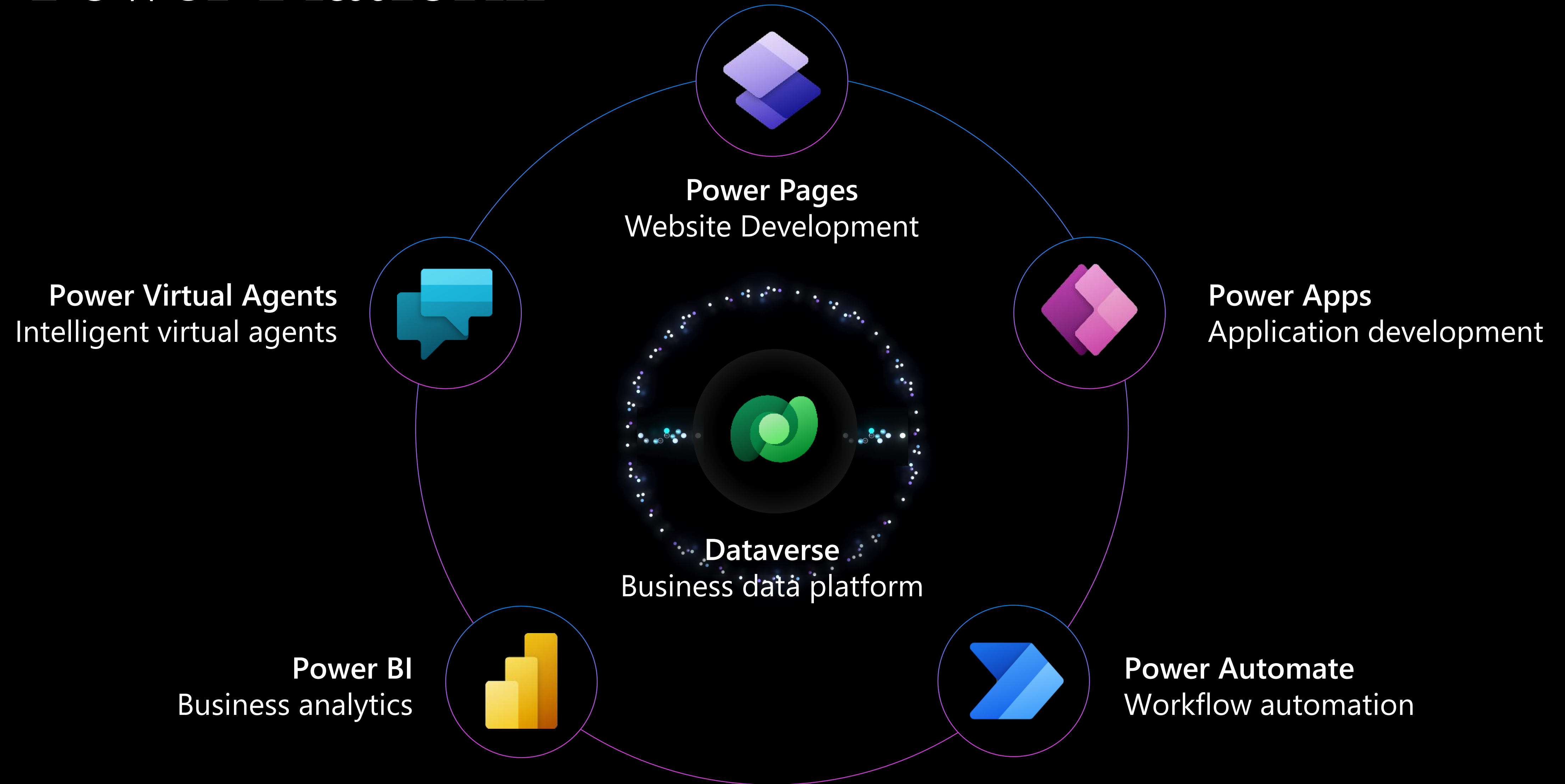
Agenda Session Goals

- Overview Power Platform / Dataverse
- Authentication / Authorization
- Pro-Code Connectivity
- Business Central Connectivity

+ Demos 

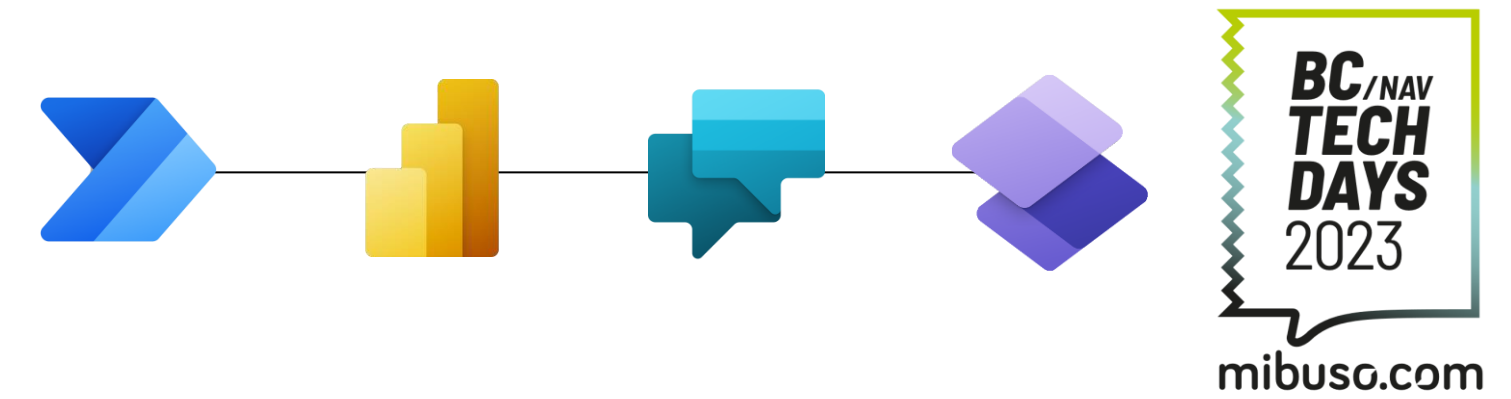


Power Platform



Power Apps

The world's most complete low-code platform



Build business apps faster, easier

Empower everyone to create impactful business solutions in hours - not months – with familiar tools.



Take your apps to the next level

Enable citizen developers to work directly with pro developers for even more advanced solutions.



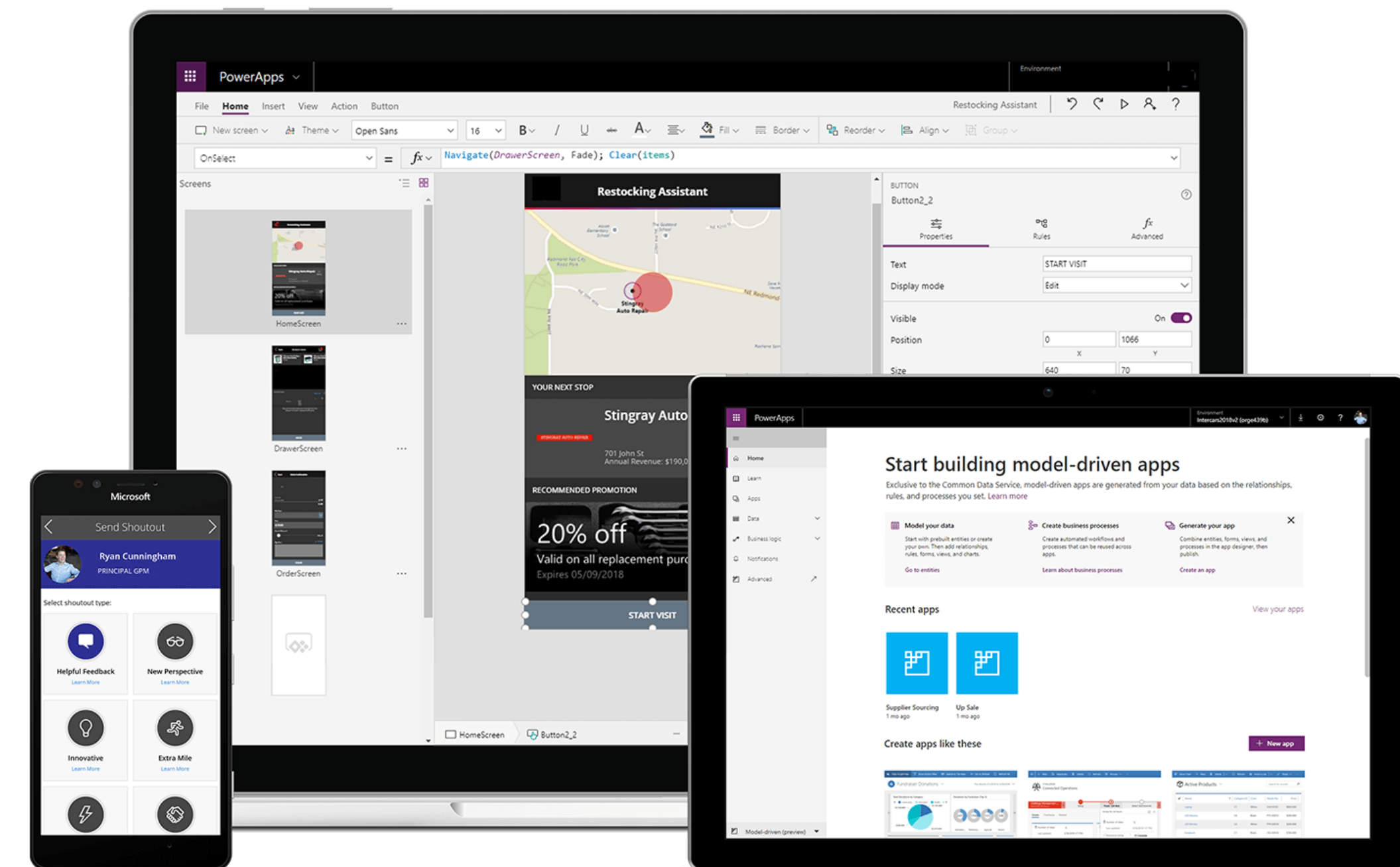
Scale with confidence

Build solutions at scale while maintaining governance, security and quality standards.



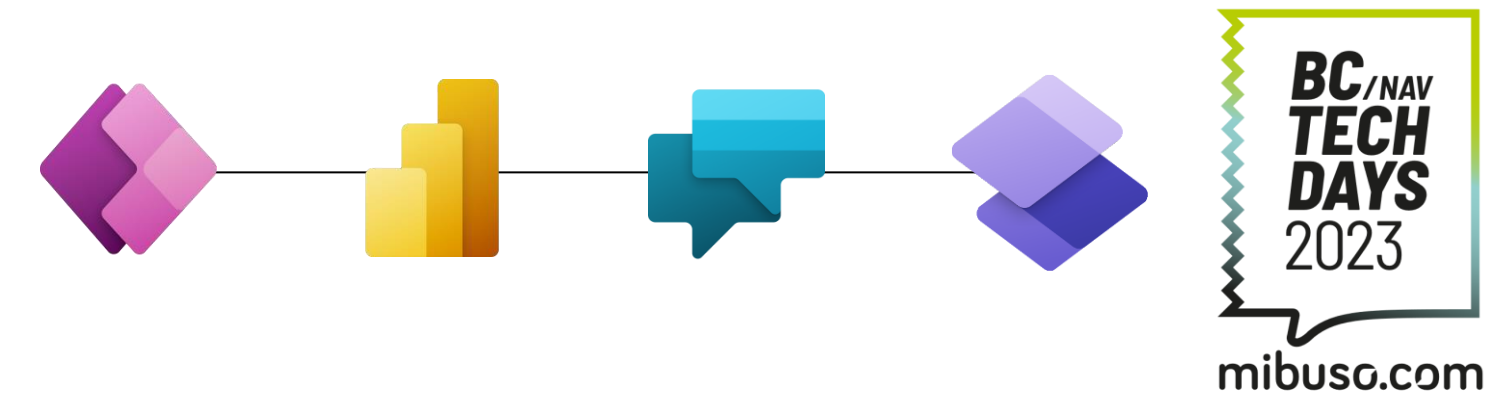
One platform, unlimited innovation

Shift your low-code apps into high gear continuously with advanced AI, analytics, bots, interactive maps, external portals, mixed reality, IoT and more.

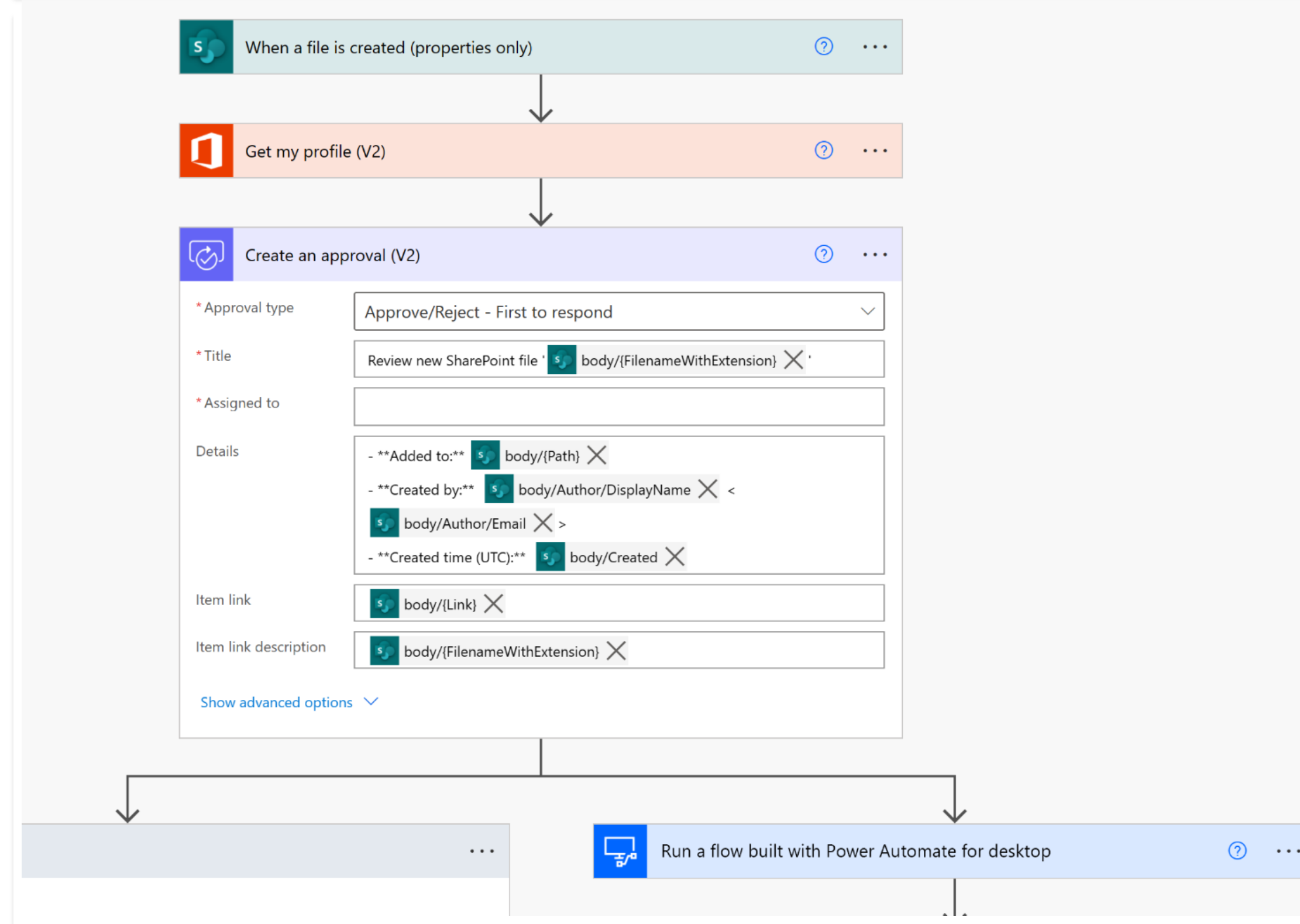


Power Automate

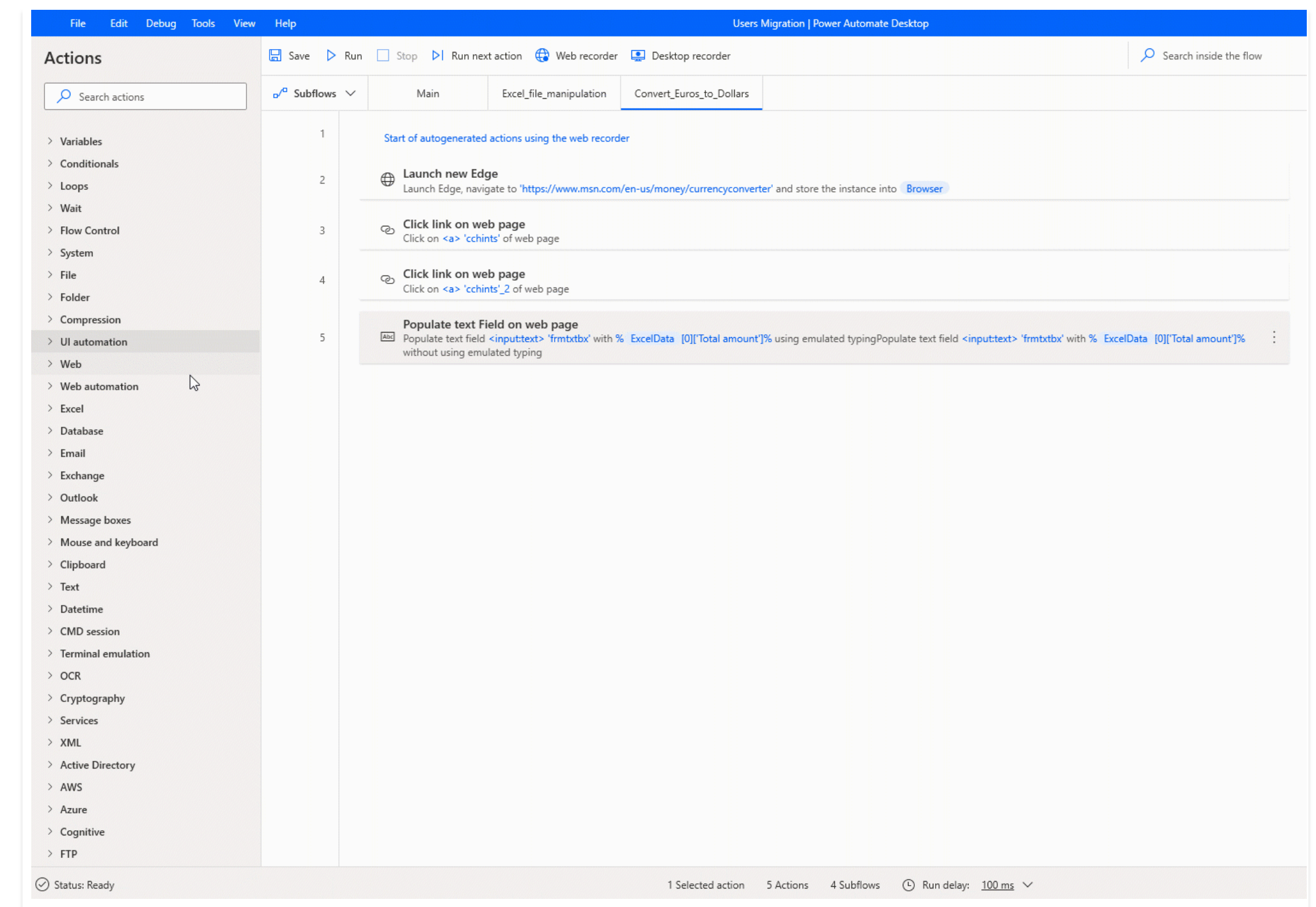
The world's most complete low-code platform



Resilient API-driven automation

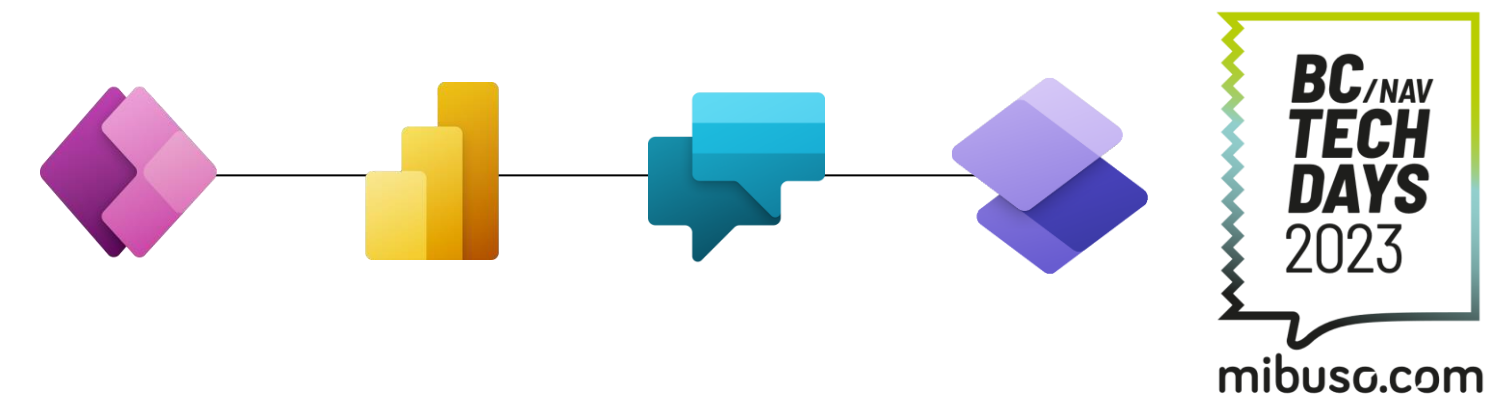


Cost-effective RPA



Power Automate

The world's most complete low-code platform



Business Process Automation

Project Operations

Search

Save Save & Close + New Project Copy Project Deactivate Book Delete Refresh Project Totals Refresh Export to PDF Process Share Email a Link

Professional Services Engagement

Project

3/29/2021 4:00 PM \$1,110.95
Due Date Estimated

Project Stages
Active for 37 minutes

New (37 Min) Quote Plan Deliver Complete

Summary Tasks Team Resource Assignments Resource Reconciliation Estimates Tracking Sales Task Billing Setup Expense Estimates Related

General

Project ID * P-001024-D

Name * Professional Services Engagement

Description --- Professional Services Engagement

Owning Company * USPM

Customer ADatum Corporation

Calendar template * PST 8 hrs

Currency USD

Contracting Unit * Contoso Software US

Project Manager * Molly Clark

Estimates

Estimated Start Date 1/28/2021

Finish Date 3/29/2021 4:00 PM

Effort (Hours) 4,992.00

Estimated Labor Cost \$1,110,952.00

Estimated Expense Cost \$52,010.00

Estimated Total Cost \$1,162,962.00

Actuals

Actual Start

Actual Finish

Actual Labor Cost

Actual Expense Cost

Actual Total Cost

Effort Completed (Hours)

Status

Overall Project Status ---

Comments ---

Status Updated On ---

Schedule

Active

Advanced Process Mining

Power Automate

Search

Environments Public Preview Demo ? CR

All processes →

Start with a popular template

Top picks Azure Finance & Operations Supply Chain Power Platform

Show me process advisor - Finance

Go through an Accounts Receivable process using our guided tour.

Accounts payable

Create an accounts payable process by connecting to your existing SAP data.

Procure to pay (P2P)

Make a procure to pay process by connecting to your existing SAP data.

Desktop flows

Gain insights on the run history of your desktop flows.

Power Virtual Agents

See what is going on under the hood of your virtual agent.

Learning more about processes

Download Power Automate Desktop

Download sample data to try out Process advisor

Process advisor MS Learn module: self-paced

Beginner 30 m

How to upload the data for process mining

Beginner 1 m 19 sec

How to analyze imported log files in process...

Beginner

How to record your process

How to prepare a recording

How to analyze a process

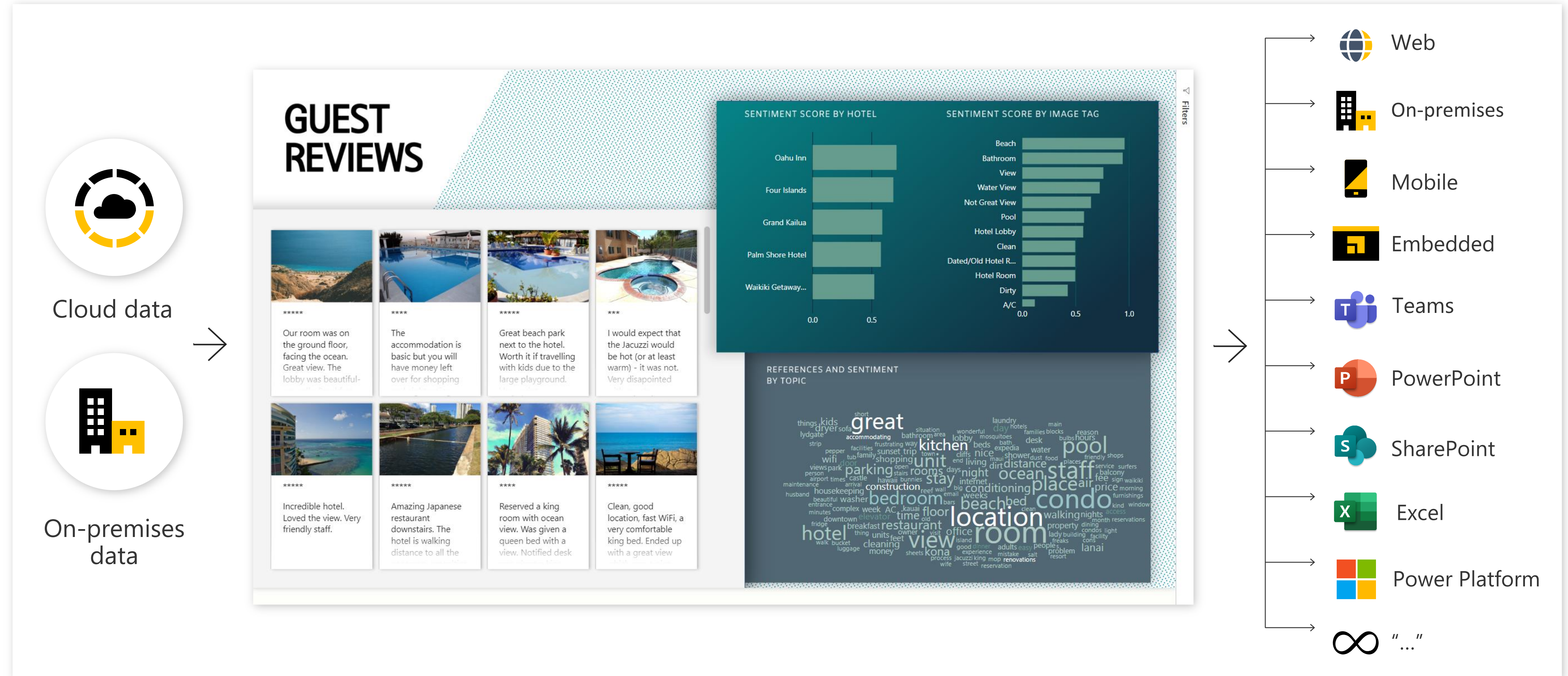
Automation recommendation

Ask a chatbot



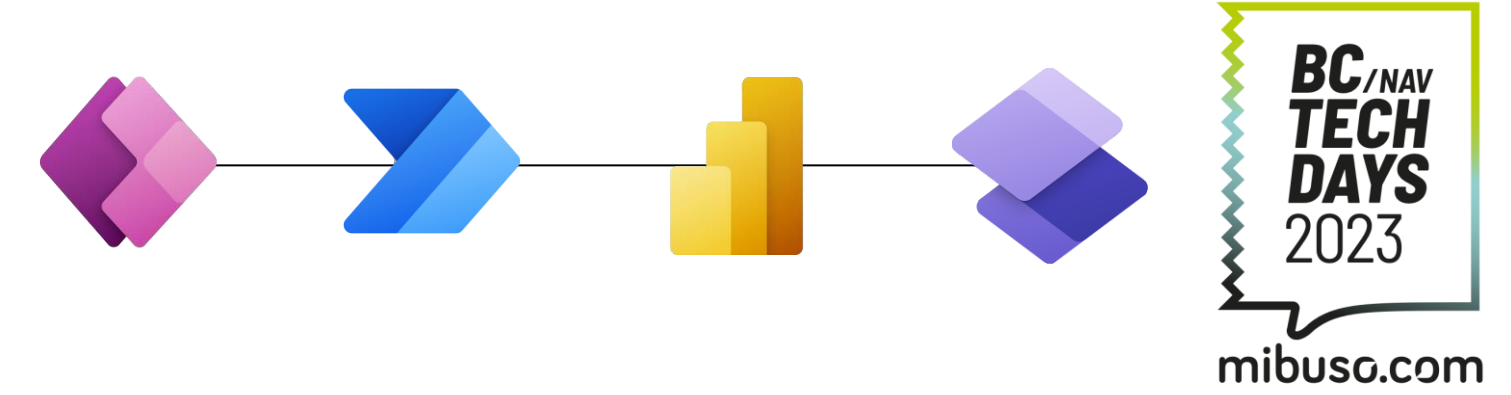
Power BI

The bridge between data and decisions



Power Virtual Agents

Easily create an Intelligent Virtual Agent



Make authoring easy for everyone

Easily test and maintain bots through a simple, easy to use graphical interface



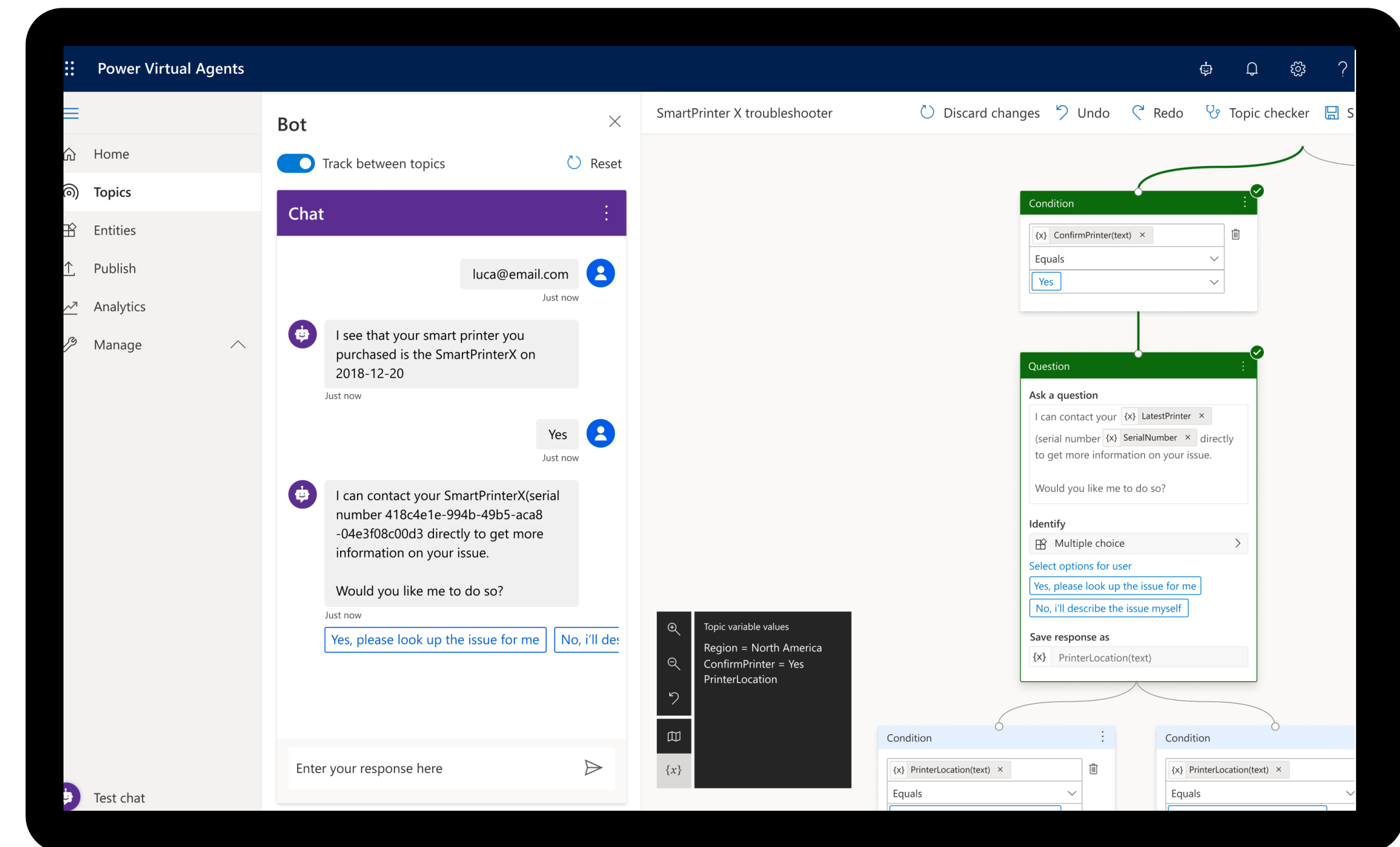
Extract information from user responses

Recognize, extract, and act on dozens of common entities in a user's responses. For example, colors, currencies, ages, dates and times. Or create your own custom entities, e.g. model numbers



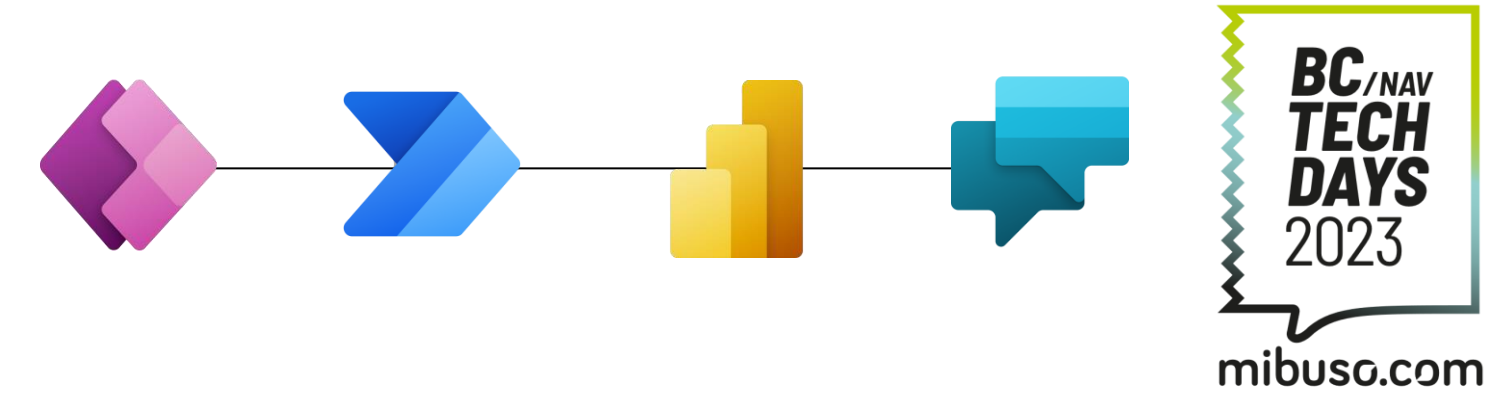
Remember user responses

Store user information for use later in variables and use them to branch or create complex conversations



Power Pages

Enables anyone to build low-code, external business websites worldwide



Make authoring easy
for everyone

Enable everyone in your organization to **design and launch engaging websites in minutes** – no coding required.



Build without
boundaries

Empower your developers with **advanced, web design tools** that can take your pages to a whole new level.



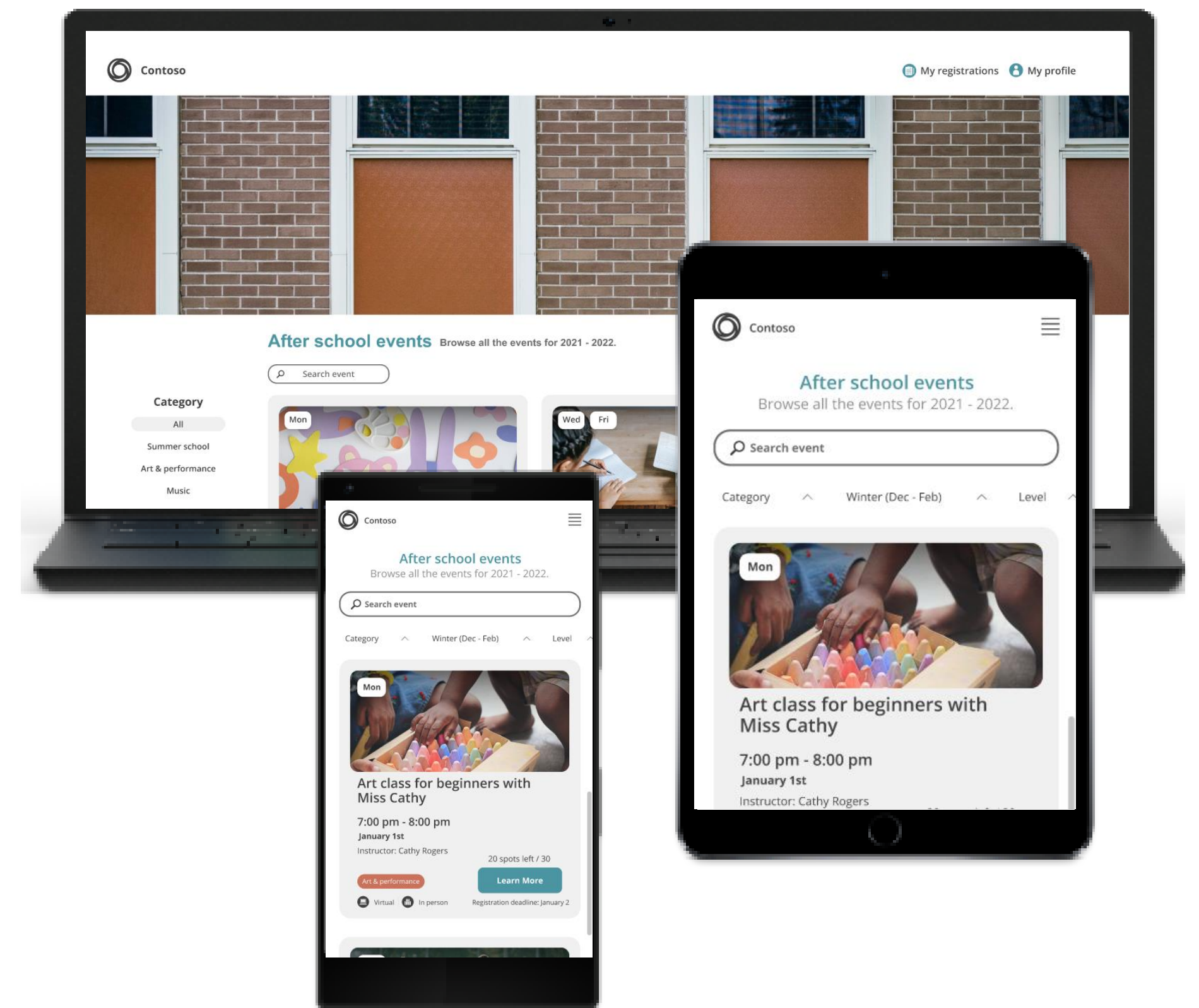
Share with confidence

Manage all your sites through **one, convenient dashboard** and meet your most demanding security and compliance requirements.



Snap in exciting new
pro-dev capabilities

Add dashboards, document sharing, chatbots, automation, and more for a smarter experience, with **seamless integration** to Power Platform and other Microsoft services.



Power Platform



Power Apps

Application development



Power Automate

Process automation



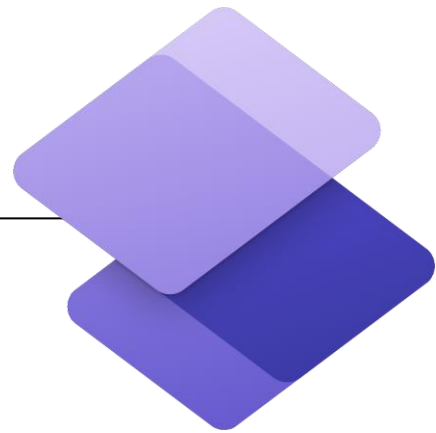
Power BI

Business analytics



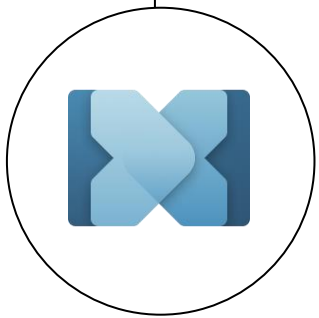
Power Virtual Agents

Intelligent bots

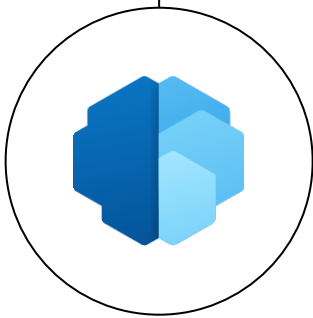


Power Pages

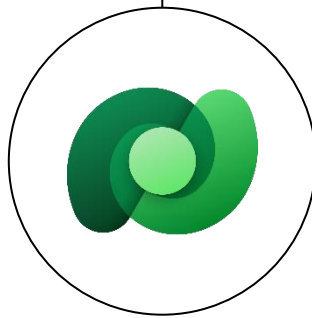
External websites



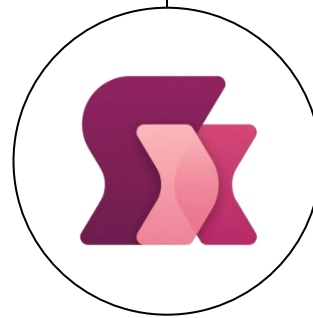
**Data
connectors**



**AI
Builder**



**Microsoft
Dataverse**



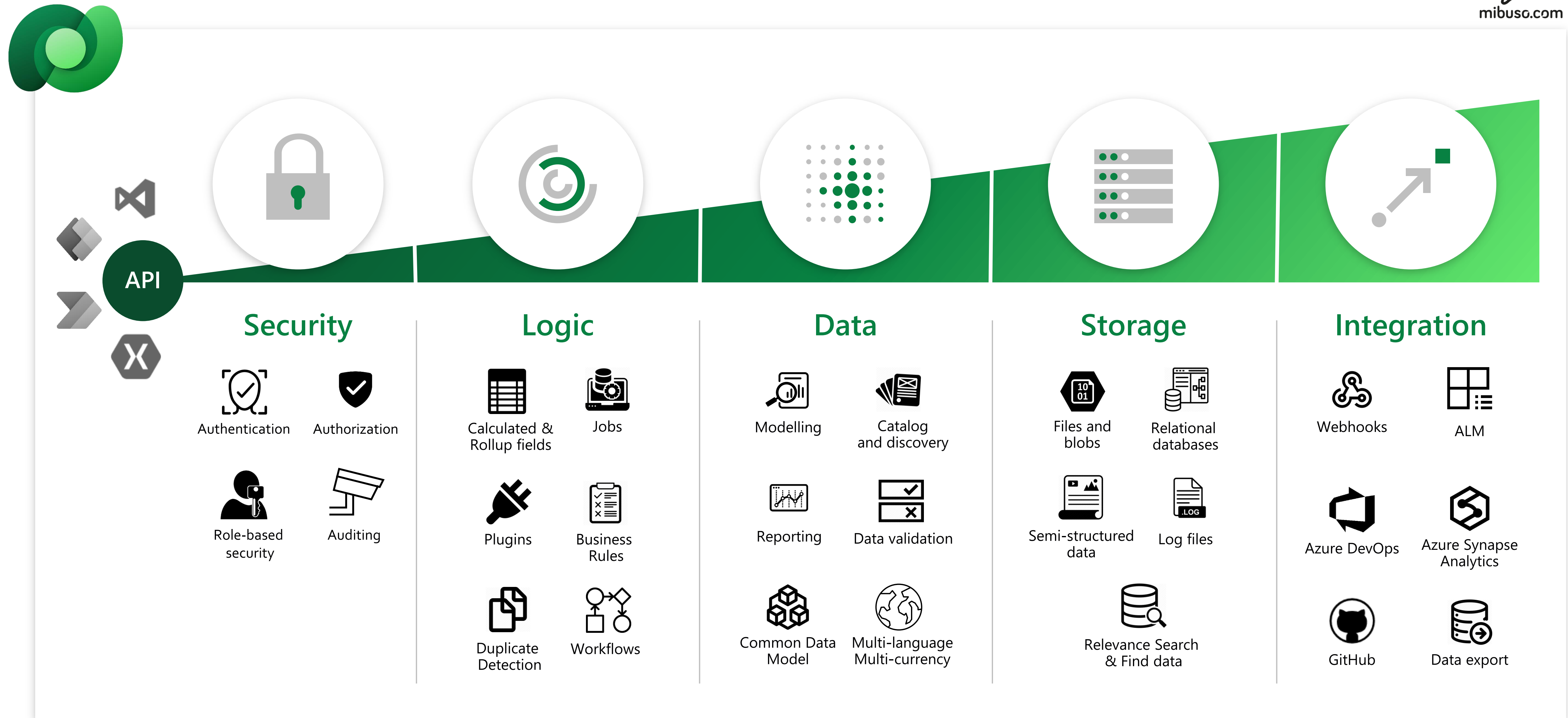
**Power
Fx**



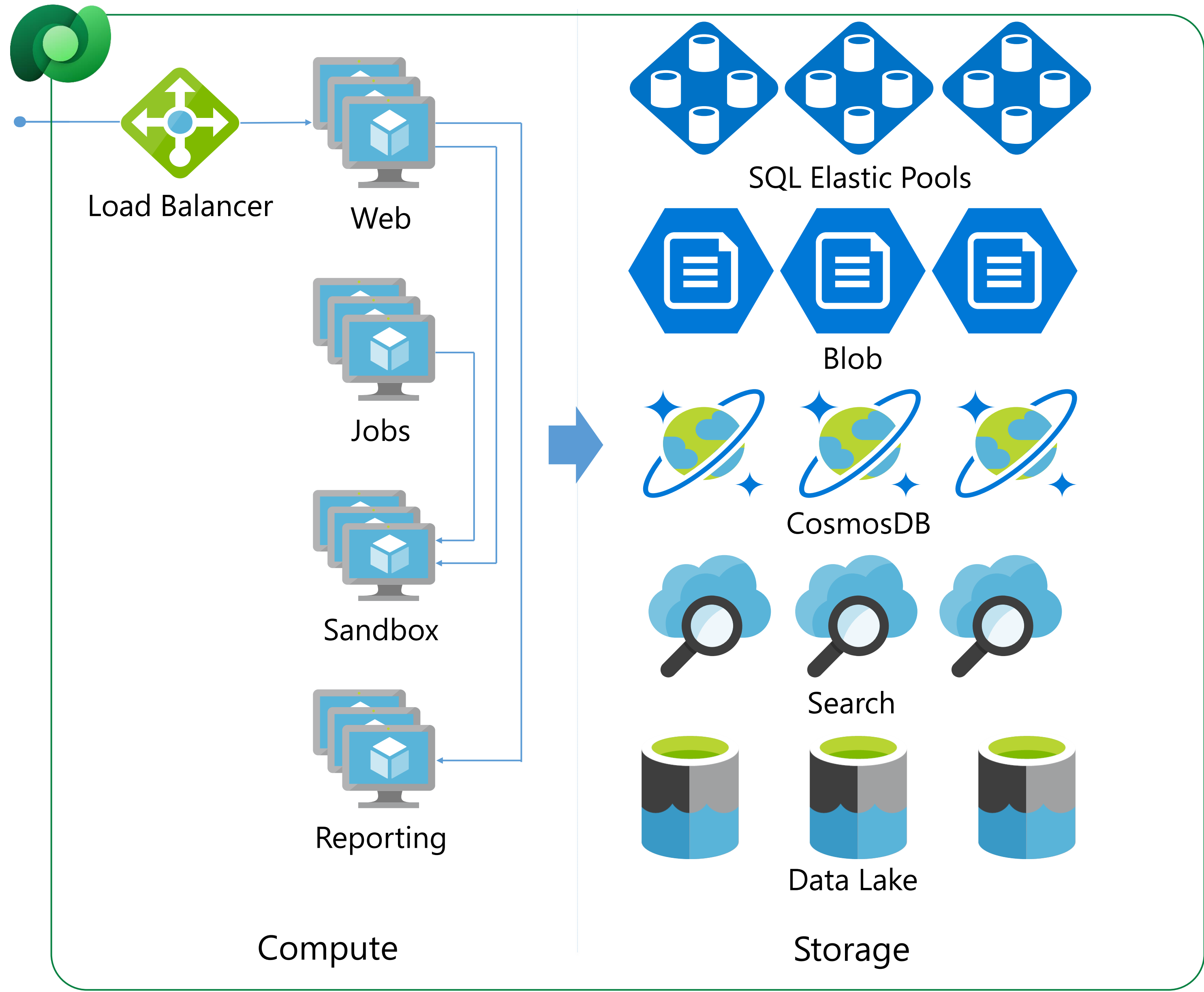
**Managed
Environments**



Microsoft Dataverse – what’s in the box?



Dataverse on Azure





low-code Dataverse connectivity

SHOWTIME



authentication & authorization

It's a story of multiple layers

Authentication & Authorization

Authentication
Who are you?

Authorization
Do you have access?

Permissions
What are you allowed to do?



Authentication basics

Authentication

is the process of proving that you are who you say you are



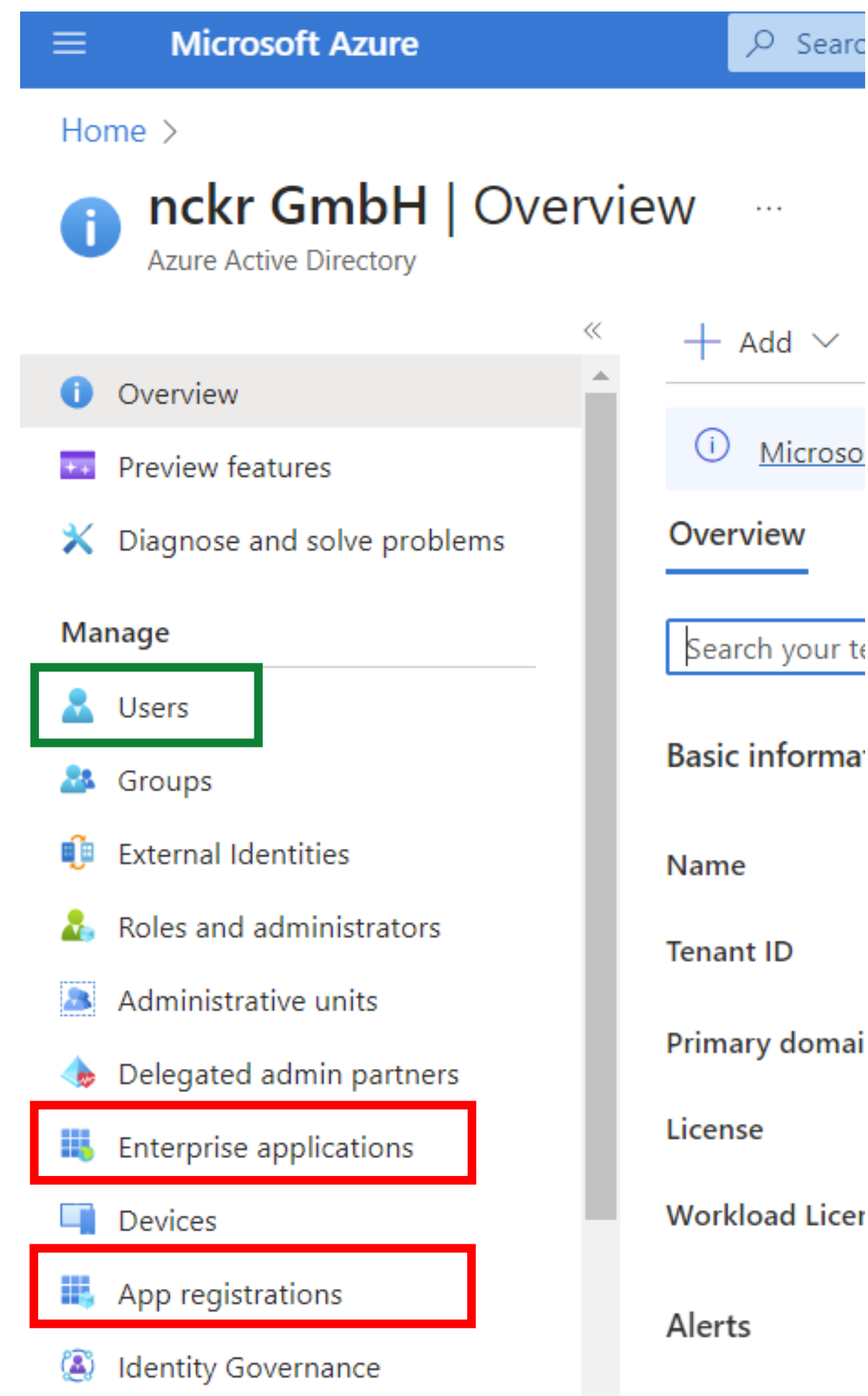
Authorization

is the act of granting an authenticated party permission to do something. It specifies what data you're allowed to access and what you can do with that data.

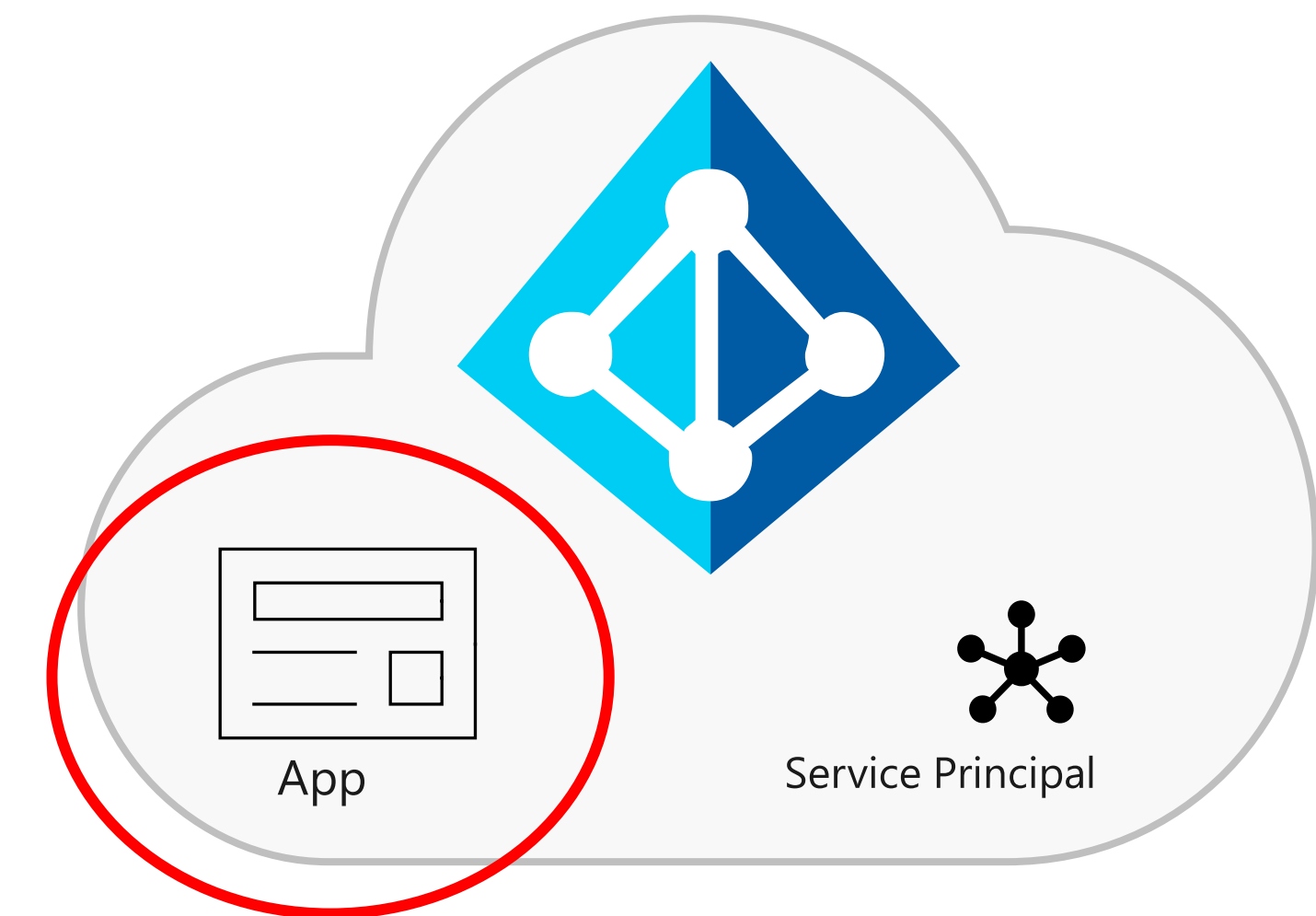


Authentication basics

Azure Active Directory



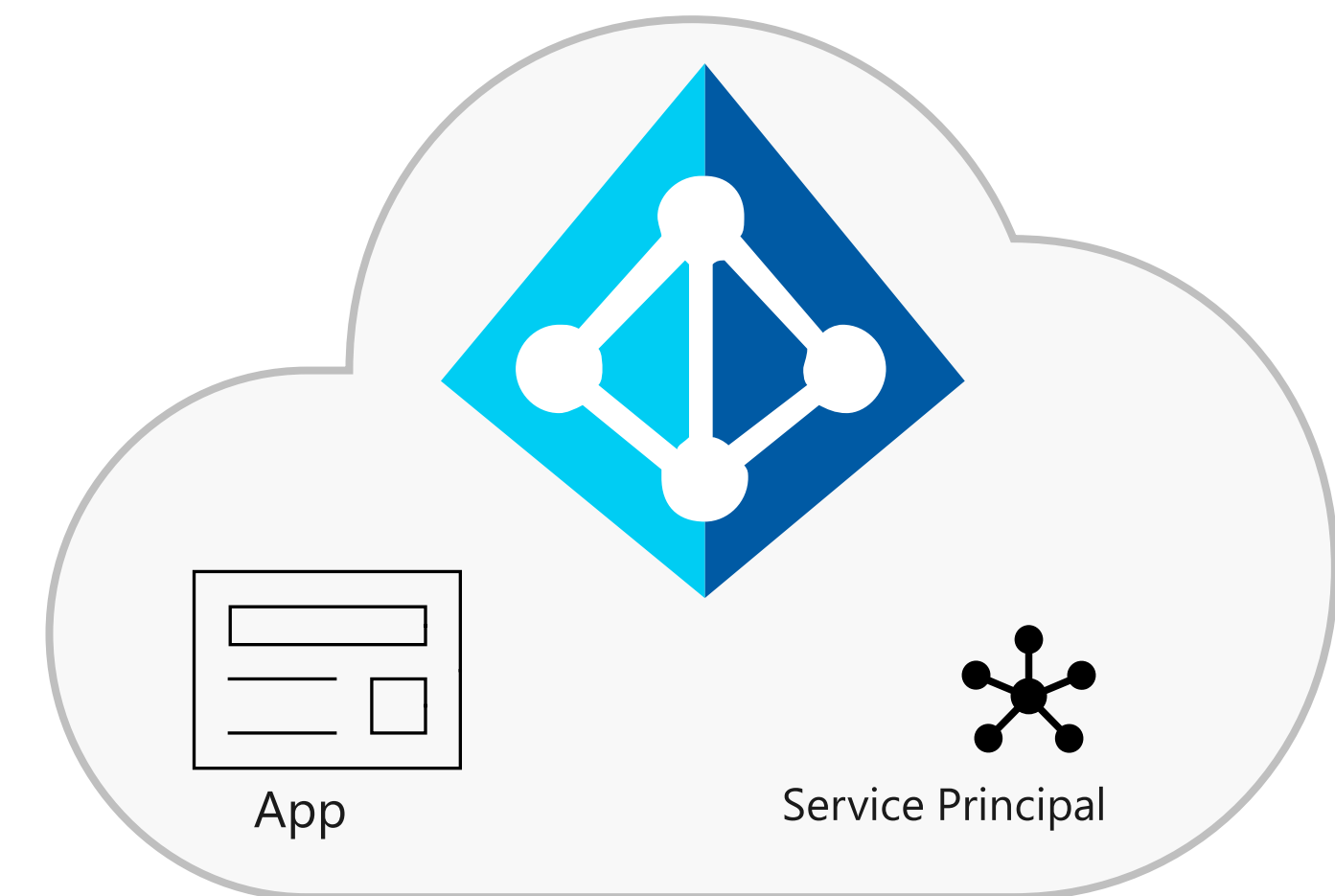
Everything needs an app



Authentication basics

Single Organization App

- App registered for a specific Azure AD directory
- **Single-tenant**
- Only accessible by users from that Azure AD directory



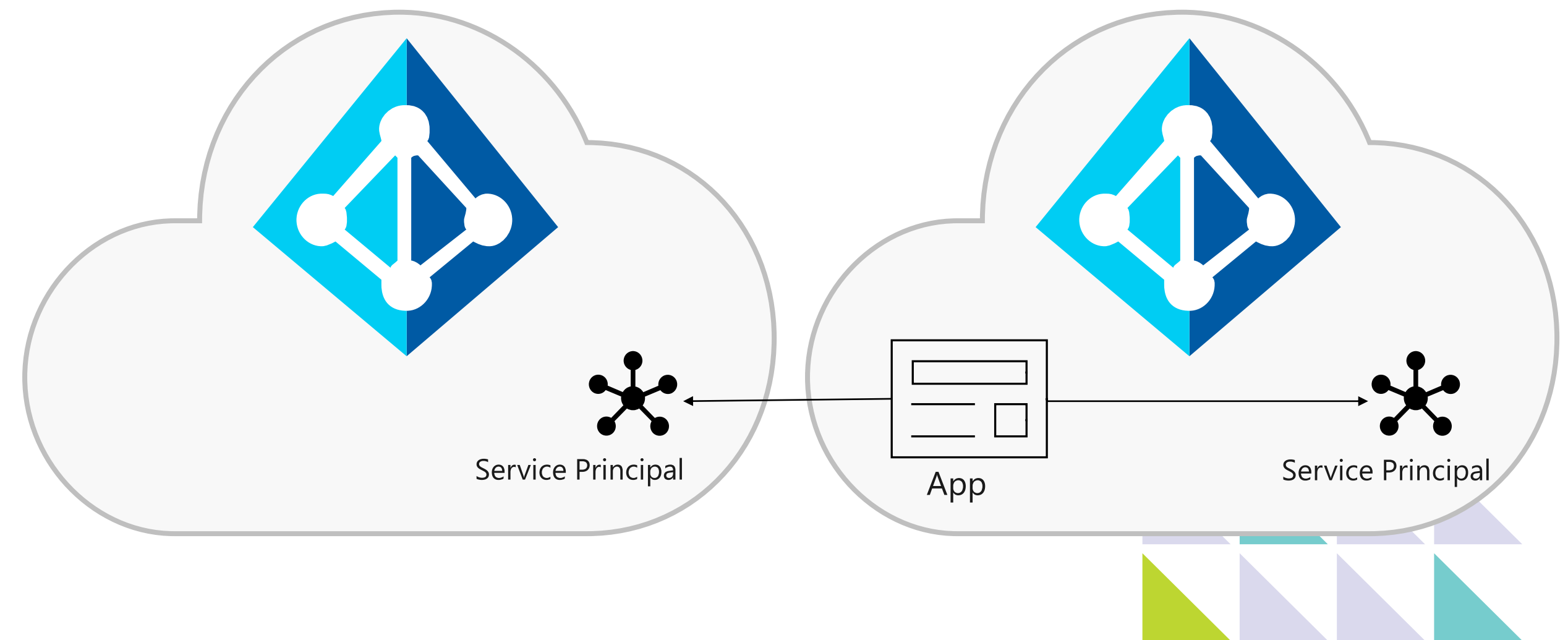
Authentication basics

Multi Organization App

- App registered for use in any Azure Directory or any Azure AD and personal Microsoft accounts (e.g. Skype, Xbox, Outlook.com)

Multi-tenant

- Registered in its “Home” directory (same process as single-tenant)
- Admins decide who can consent to apps in their tenant
- Developers are responsible for limiting to specific tenants!!



Permissions and consent

Delegated permissions

Used by apps with a signed-in user present

Either the user or an administrator consents to the permissions the app requests

App is then enabled to act on behalf of the signed-in user

Important to note: users do not grant apps permission; they grant the app ability to act on their behalf

Application permissions

Used by apps that run without a signed-in user present

When the administrator grants application permissions, unlike delegated permissions, the grant isn't done on behalf of any specific user

Client application is directly granted the application permission

Important to note: requires the creation of an Application User in the Dataverse environment



Connection Credentials

User or Service Accounts

- Named account
- Requires username & password
- Conditional Access & MFA impact flows
- Account lifecycle can impact flows
- Requires licenses
- Supported in many connectors
- Separation of concerns == more licenses
- Lower API limits

Service Principals aka. Application Users

- System account
- Uses client id & client secret
- Secret lifetime to be monitored
- Managed separately
- Don't require licenses
- Limited connector support
- Separation of concerns == more SPN's
- Higher API limits



Managed Identities

are better than

Service Principals or Application Users

are better than

Service Accounts

are better than

User (or named) Accounts



Security Roles

Authorization

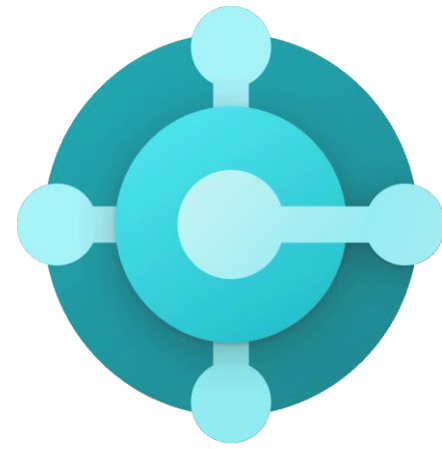
- Users & Application Users need a security role
- Without a Security Role, no access!
- Security Roles define what a user can and cannot do

Tables Miscellaneous privileges Privacy-related privileges

Show only assigned tables

Compact Grid View

Table ↑	Name	Record ownership	Permission Settings	Create	Read	Write	Delete
Business Management (17)							
Business Process Flows (3)							
Core Records (44)							
Custom Tables (19)							
AI Builder Datasets Container	msdyn_aibdatasetscontainer	User or Team	Custom	None	User	None	None
AI Builder Feedback Loop	msdyn_aibfeedbackloop	User or Team	Custom	User	User	None	None
AI Event	msdyn_aievent	User or Team	Custom	User	User	None	User
AI Model	msdyn_aimodel	User or Team	Custom	None	User	None	None
AI Object Detection Label	msdyn_aiodlabel	User or Team	Reference	None	Organization	None	None



Concept comparison



Dynamics 365 Business Central

Azure Active Directory Application Card

BCKiota

Grant Consent | More options

General

Client ID {cc12dd87-1382-4f39-a40b-1d7...}

Description BCKiota

State Enabled

Contact Information

Extension

App ID {00000000-0000-0000-0000-00...}

App Name

User information

User ID {46c6fd88-7956-4e39-9c48-6aa...}

User Name BCKIOTA

You must set the State field to Disabled before you can mak...

User Permission Sets

New Line Delete Line Permissions

Permission Set ↑	Description	Company ↑	Extension Name	Permission Scope
→ D365 BASIC	Dynamics 365 B...		Base Application	System

Details

Name

NckrWebPowerCMSQueryToDataManaged

Azure Active Directory app name

NckrWebPowerCMSQueryToDataManaged

App ID

2832ba3f-864d-4333-a391-7b1887bbfc82

State

Active

Security roles(2)

Name ↑	Type	Business unit
nckr Content Read	Direct	CXC
nckr Event Read	Direct	CXC

App type

Custom



authentication & authorization

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Pro-code Dataverse connectivity

Work with data in Dataverse, using code

The options are plentiful, and mostly confusing...

- `/XRMServices/2011/OrganizationData.svc` aka. OrganizationDataService, using OData v2.0 ==> DEPRECATED!
- `/api/data/v9.2` aka. Web API, using OData v4.0
 - The future 😊
- `CrmServiceClient` aka. OrganizationService, using SOAP ==> SUPERSEDED!
 - The SDK, but only for .NET Framework
 - Still used in the sandbox
- `DataverseServiceClient` aka. OrganizationService
 - The SDK, for .NET Core and .NET 6+
 - The future 😊



ServiceClient SDK's

Late-bound Code

- No generated classes
- Runtime validation
- Limited Intellisense

```
//Use Entity class specifying the entity logical name
var account = new Entity("account");

// set attribute values
// string primary name
account["name"] = "Contoso";
// Boolean (Two option)
account["creditonhold"] = false;
// DateTime
account["lastonholdtime"] = new DateTime(2017, 1, 1);
// Double
account["address1_latitude"] = 47.642311;
account["address1_longitude"] = -122.136841;
// Int
account["numberofemployees"] = 500;
// Money
account["revenue"] = new Money(new decimal(5000000.00));
// Picklist (Option set)
account["accountcategorycode"] = new OptionSetValue(1); //Preferred customer

//Create the account
Guid accountid = svc.Create(account);
```

Early-bound Code

- Generated classes using tool
- Compile-time validation
- Supports Intellisense

```
var account = new Account();
// set attribute values
// string primary name
account.Name = "Contoso";
// Boolean (Two option)
account.CreditOnHold = false;
// DateTime
account.LastOnHoldTime = new DateTime(2017, 1, 1);
// Double
account.Address1_Latitude = 47.642311;
account.Address1_Longitude = -122.136841;
// Int
account.NumberOfEmployees = 500;
// Money
account.Revenue = new Money(new decimal(5000000.00));
// Picklist (Option set)
account.AccountCategoryCode = new OptionSetValue(1); //Preferred customer

//Create the account
Guid accountid = svc.Create(account);
```

Helpful Tooling

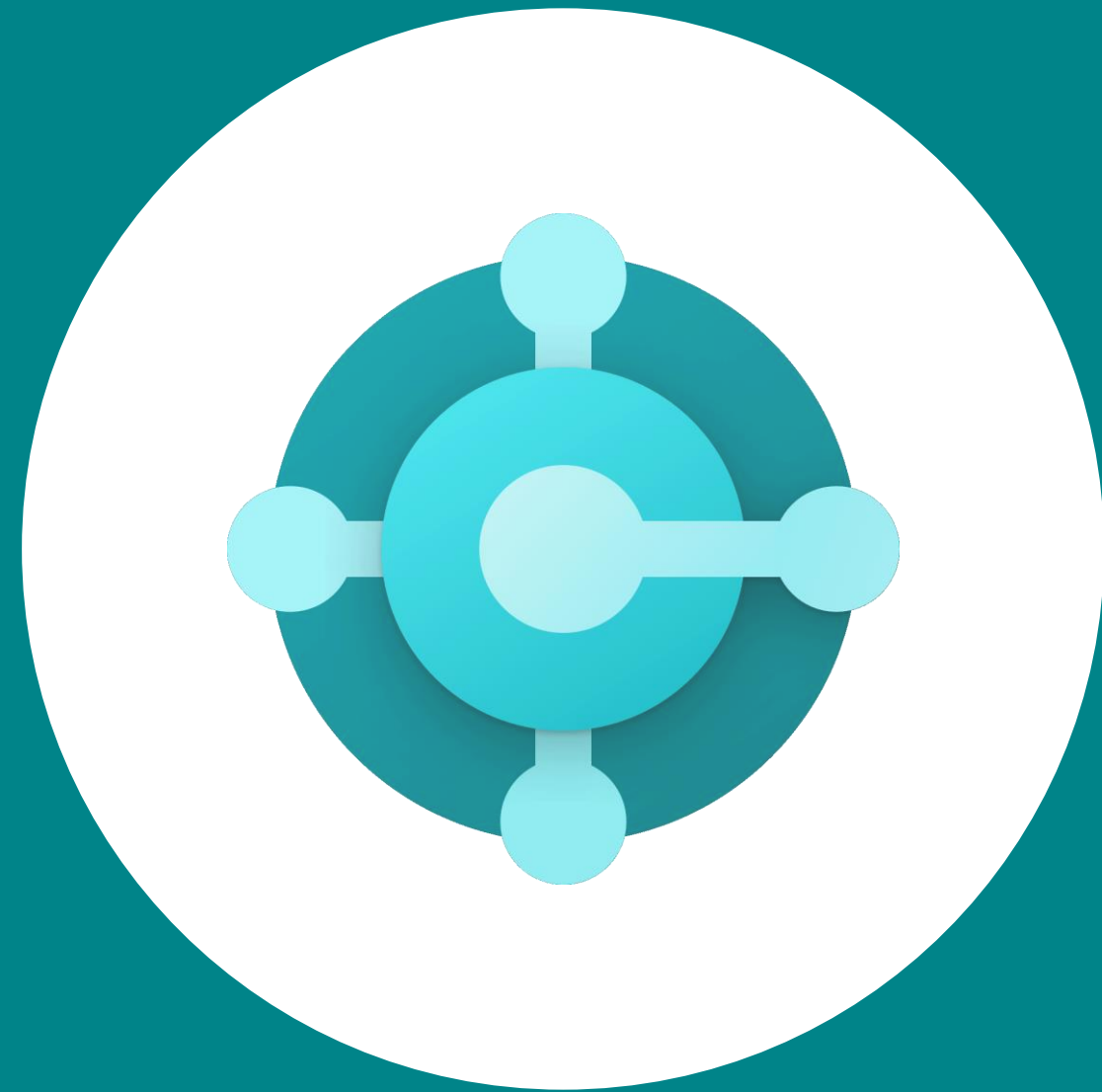
For early-bound

- CrmSvcUtil.exe
- Early Bound Generator in XrmToolBox
- pac modelbuilder
- Early Bound Generator v2 in XrmToolBox

For Dataverse queries

- FetchXML Builder
- Dataverse REST Builder

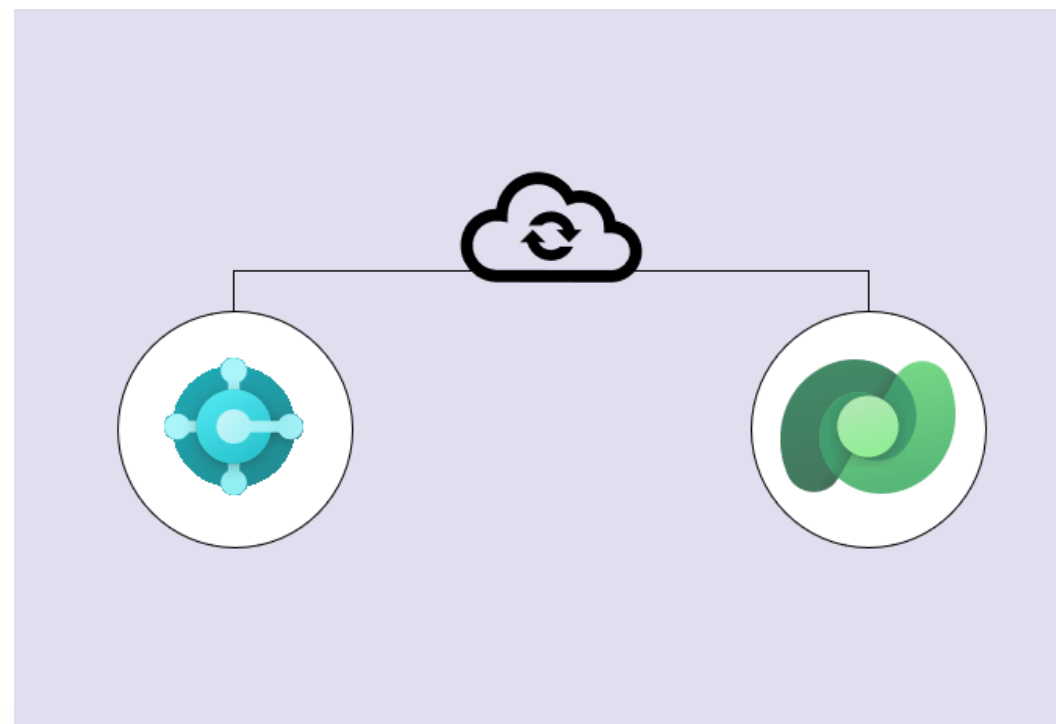




What about Business Central?

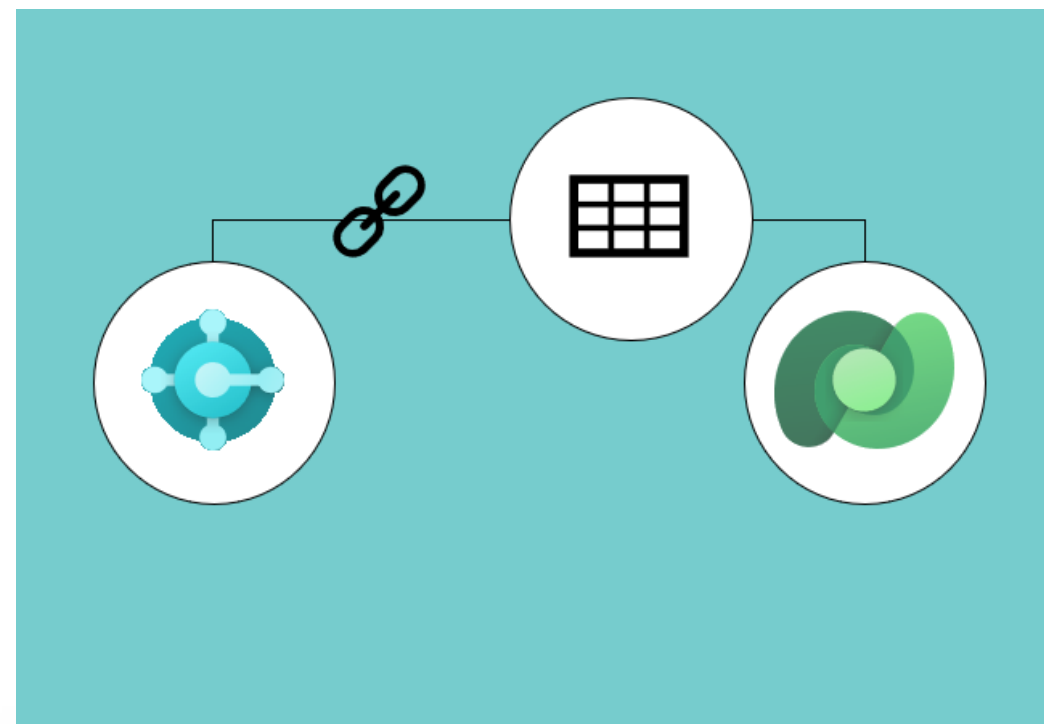
What about Business Central connectivity?

With or without Dataverse



Data synchronization

- Data lives in Dataverse tables
- Data is accessible using all previous methods
- Requires permissions on Dataverse tables only



Virtual tables

- Data is virtualized in Dataverse
- Data is accessible using all previous methods
- Requires permissions on Business Central side

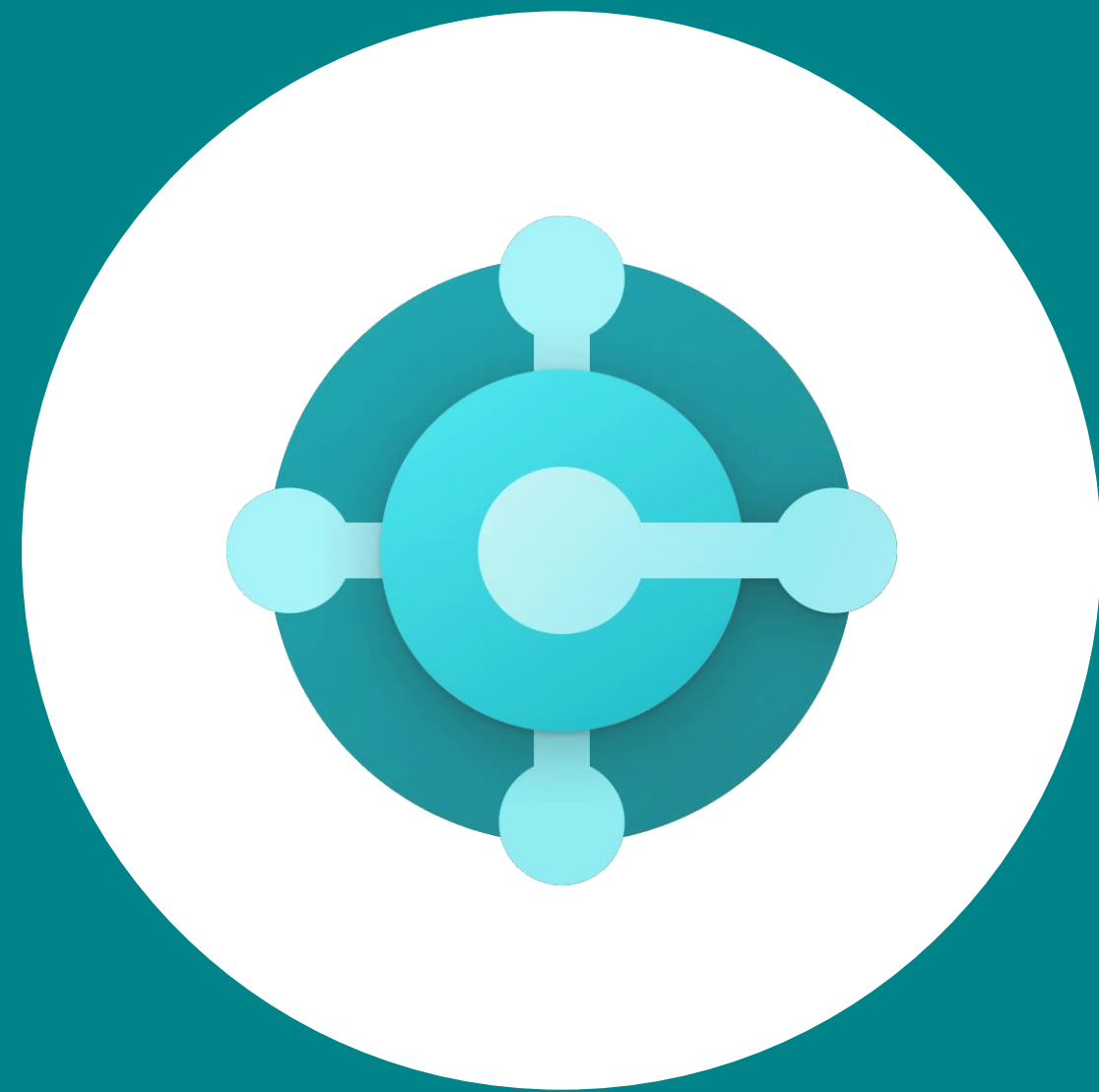
```

on="1.0" encoding="utf-8"?>
Version="4.8" xmlns:edmx="http://docs.oasis-open.org/odata/ns/edmx">
dataServices>
Schema Namespace="Microsoft.NAV" xmlns="http://docs.oasis-open.org/odata/ns/edmx">
  <EntityType Name="entityMetadata">
    <Key>
      <PropertyRef Name="entityName" />
    </Key>
    <Property Name="entityName" Type="Edm.String" Nullable="false" />
    <Property Name="entitySetName" Type="Edm.String" />
    <Property Name="entityCaptions" Type="Collection(Microsoft.NAV.entityMetadataCaption)" />
    <Property Name="entitySetCaptions" Type="Collection(Microsoft.NAV.entityMetadataCaption)" />
    <Property Name="properties" Type="Collection(Microsoft.NAV.entityMetadataProperty)" />
    <Property Name="actions" Type="Collection(Microsoft.NAV.entityMetadataAction)" />
    <Property Name="enumMembers" Type="Collection(Microsoft.NAV.entityMetadataEnumMember)" />
  </EntityType>
  <ComplexType Name="entityMetadataLabel">
    <Property Name="languageCode" Type="Edm.Int32" Nullable="false" />
    <Property Name="caption" Type="Edm.String" Nullable="false" />
  </ComplexType>

```

Business Central APIs

- User/SPN needs permissions on Business Central side
- No SDK's available by MS, build your own HttpClient
- Generate SDK with Kiota

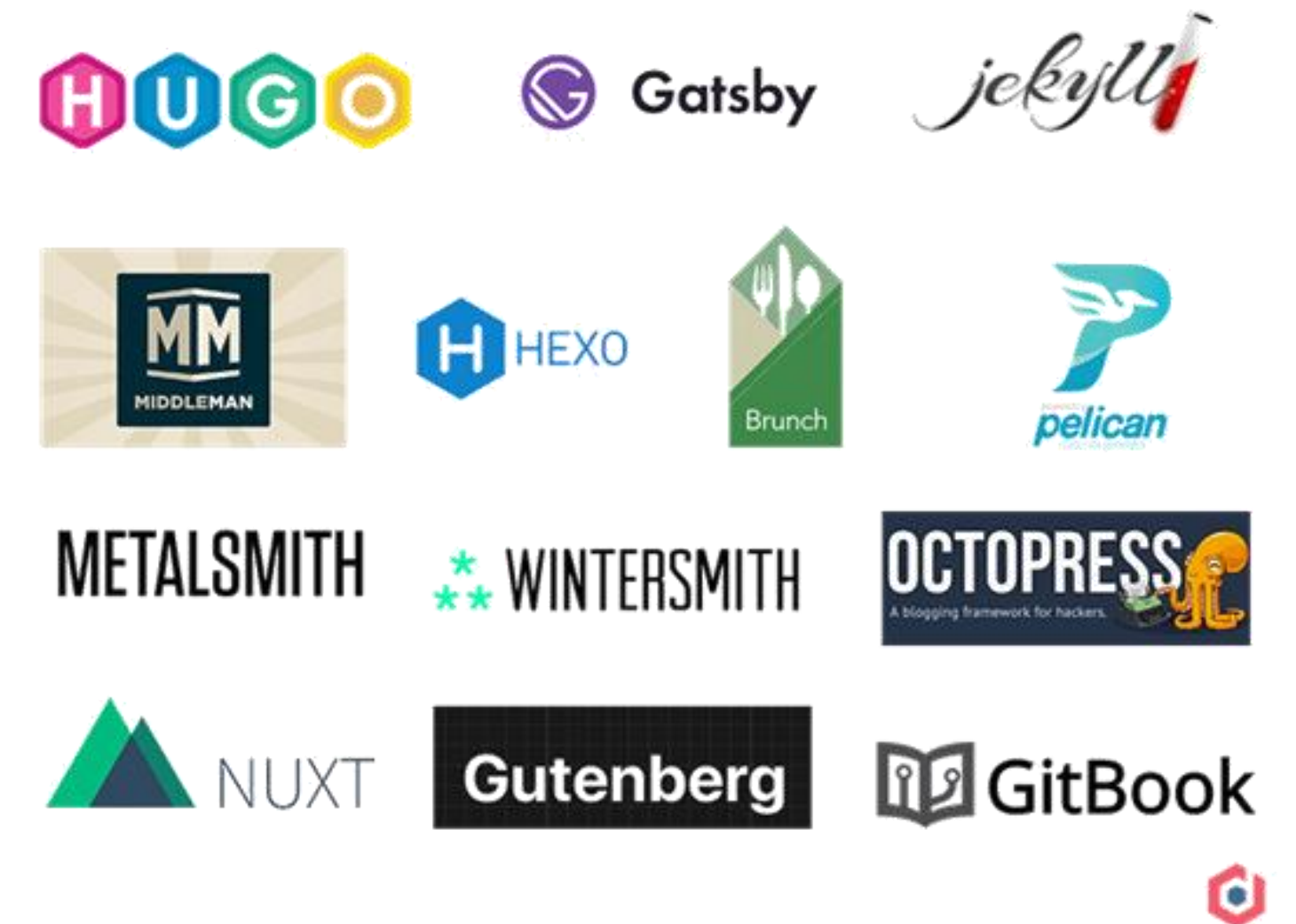
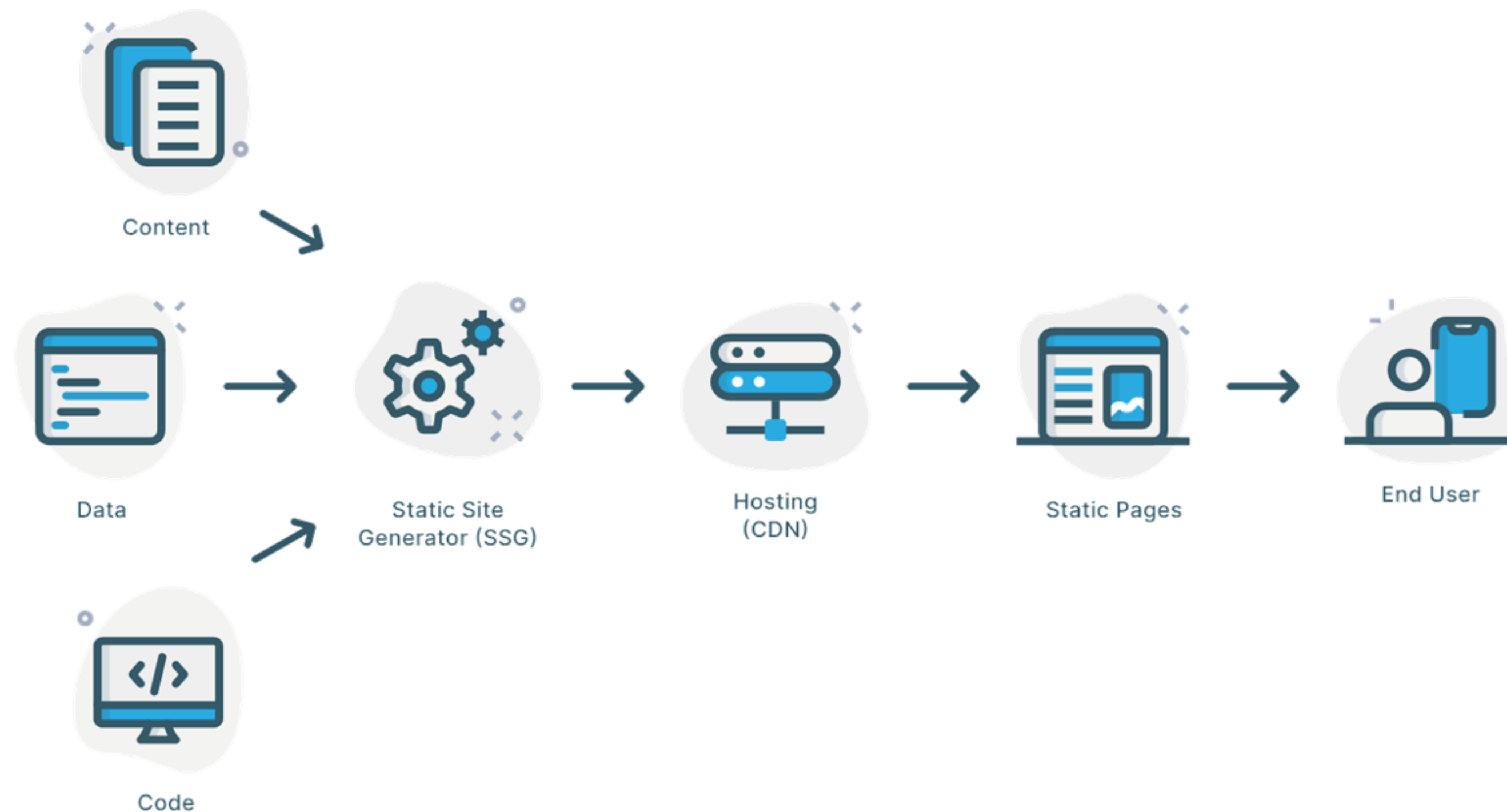


What about Business Central?

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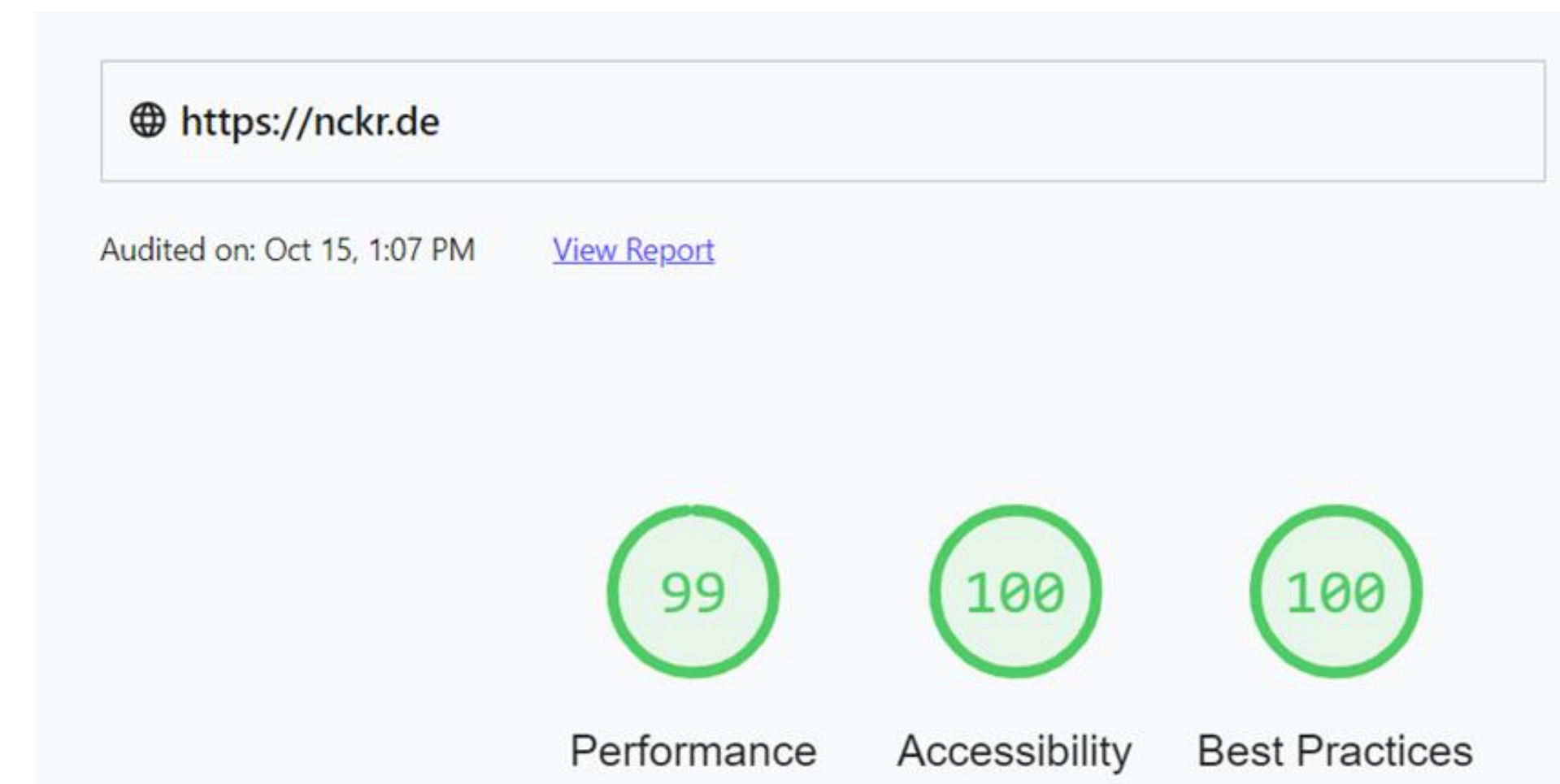
Use Case: Build your own portal

Static Site Generators

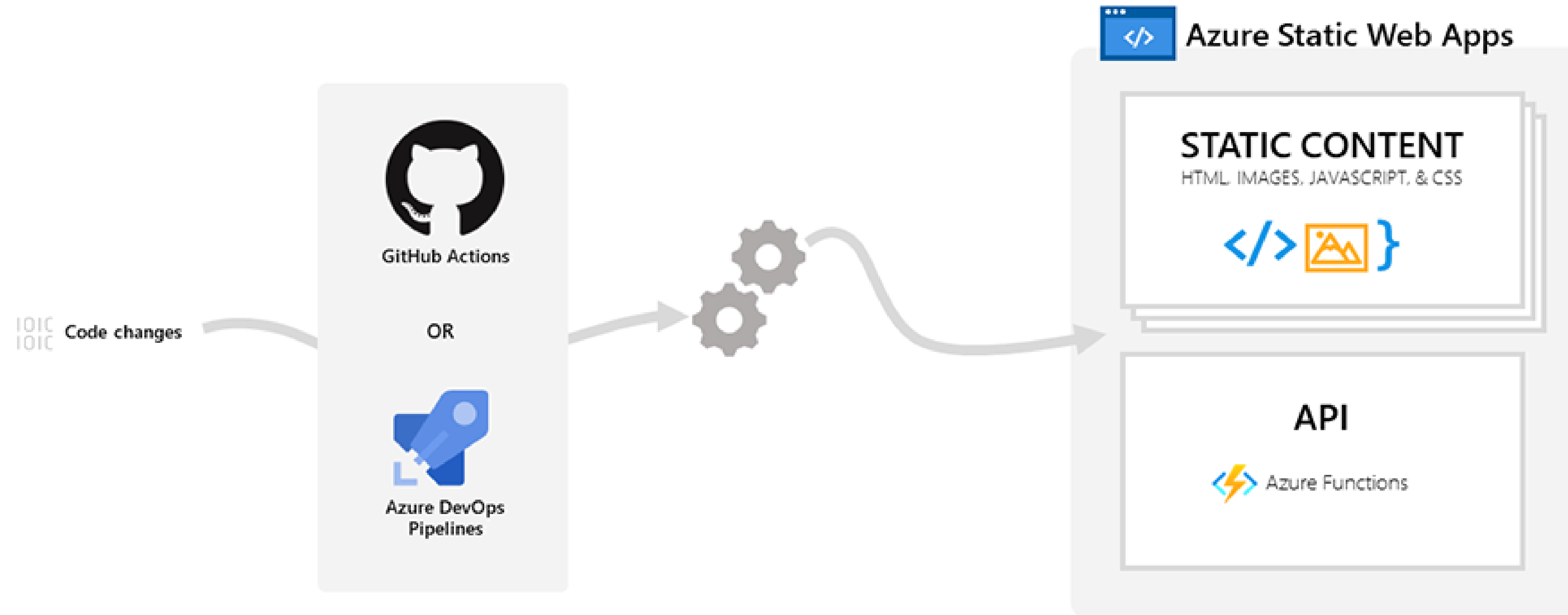


Static Site Generator – Advantages

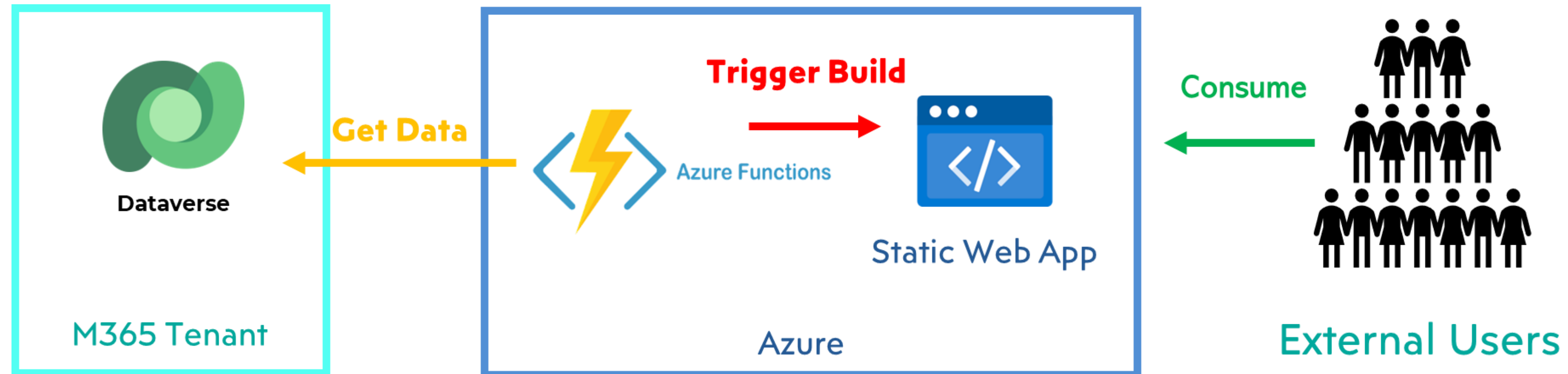
- Very fast
- Very cheap / free
- Very safe, only few dependencies
- Open source, different frameworks
- Can be run locally or in cloud



Azure Static Web Apps



PowerCMS





pro-code Dataverse
connectivity

authentication &
authorization



SHOWTIME

Do the Do's!

- Delegated authentication for Users
- App-only: Managed Identity > Service Principals > Service Account
- Scoped privileges / Least privilege / Permission Concept
- Web API for OData access to Dataverse
- ServiceClient for .NET Core with Early-Bound code
- Use helper tools ➞ XrmToolBox

Use Dataverse & Power Platform 😊



Q&A

Any Questions?



Thank
You!

