

**NAV
TECH
DAYS**
2018

mibuso.com

Evolution of a titan: a look at the development of NAV from an MVP angle

~~VJEKOSLAV DABIC, ERIC WAUTERS~~

vjeko & waldo

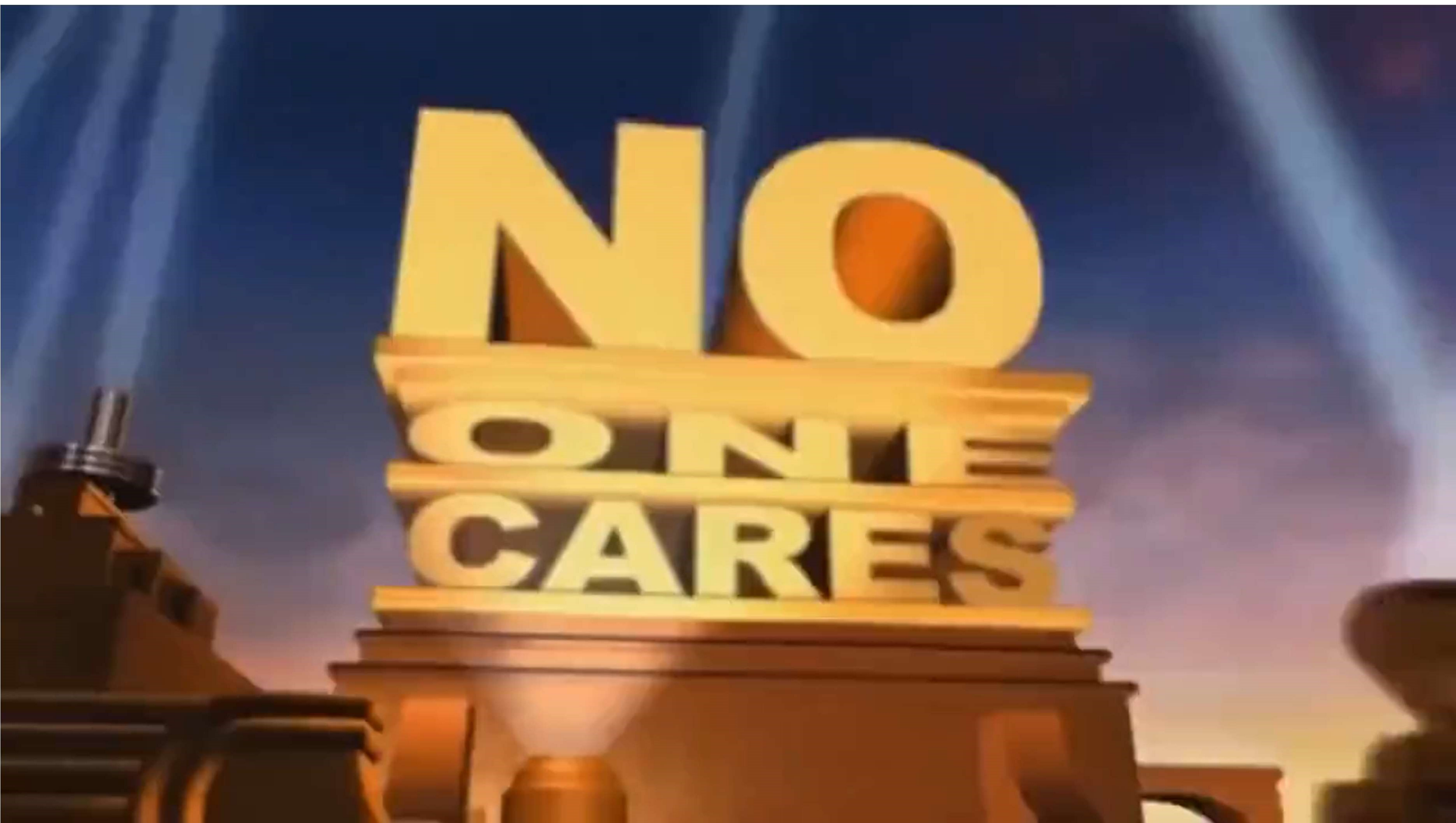
When you are passionate about
Microsoft Dynamics NAV/365 Business Central

www.navtechdays.com

**NAV
TECH
DAYS**
2018

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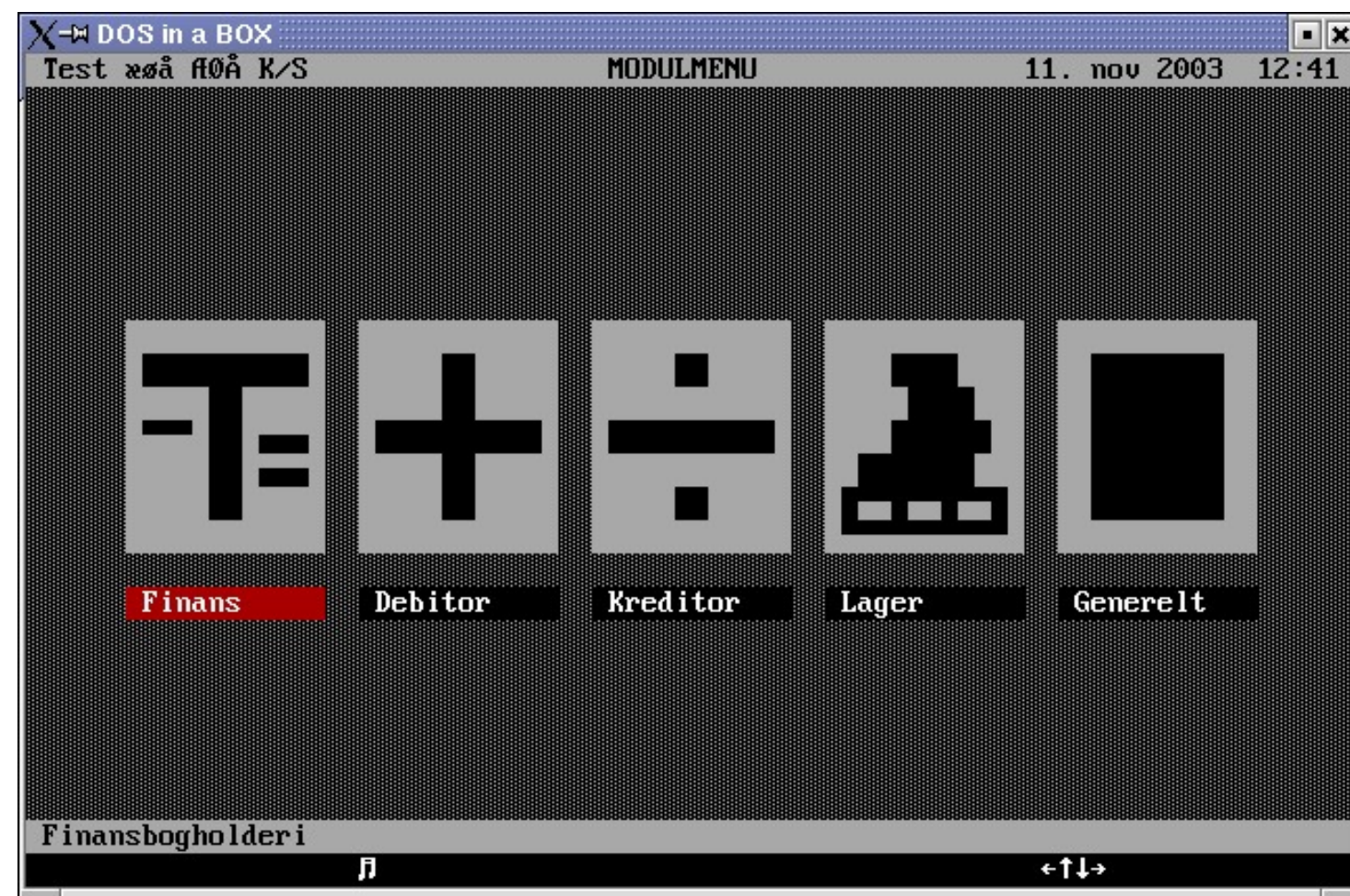


If you don't have problems,
you don't need solutions.

Chief cause of problems is solutions.



System to support my business processes



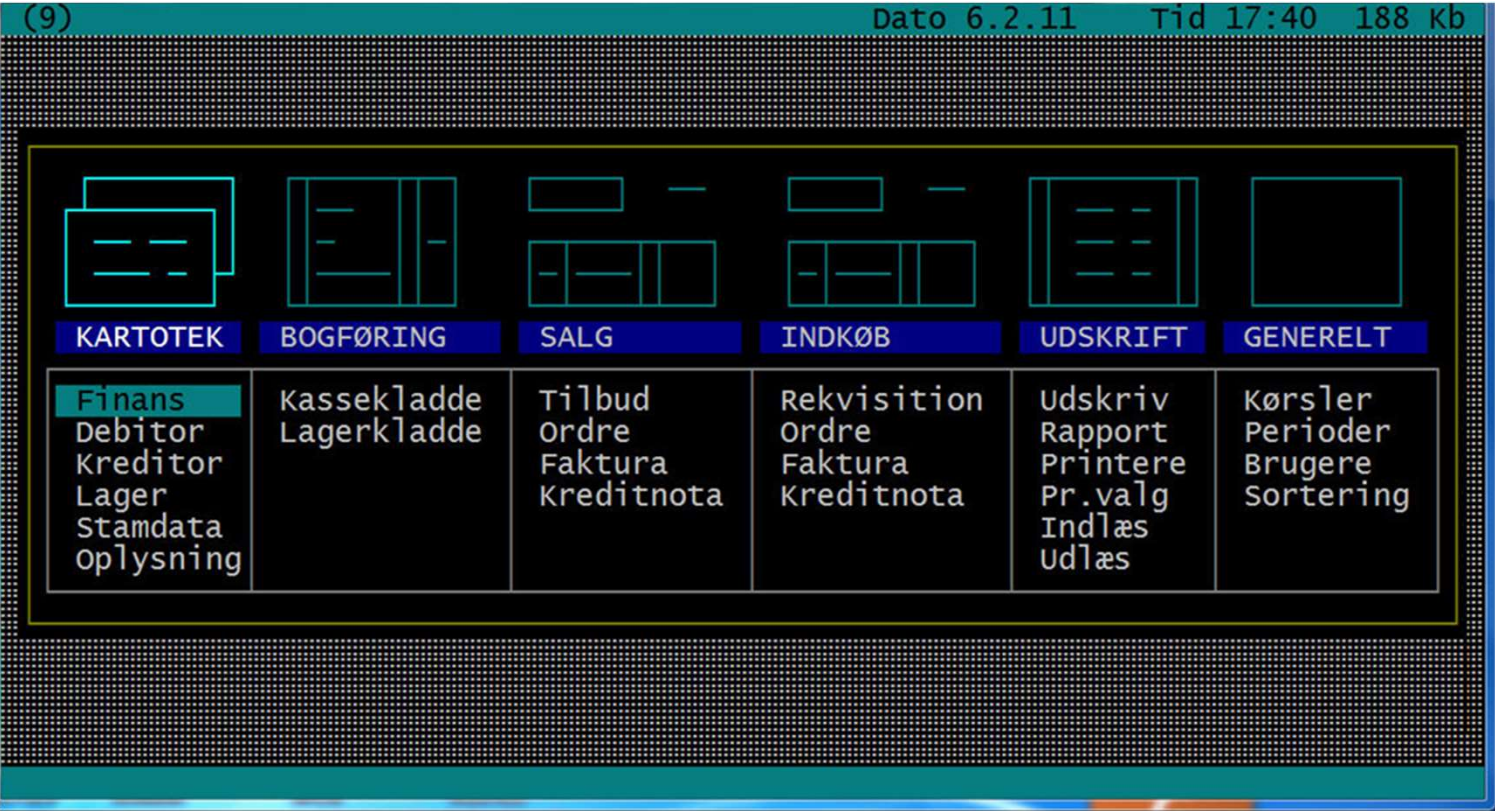
1983 PC&C

System to support
my business
processes

How to get more people in the system

System to support
my business
processes

How to get more people in the system



1987 Navigator

System to support
my business
processes

How to get more
people in the
system

How to get even more people in the system

System to support
my business
processes

How to get more
people in the
system

How to get even more people in the system



System to support
my business
processes

How to get more
people in the
system

How to get even
more people in the
system

Integrate with other systems

System to support
my business
processes

How to get more
people in the
system

How to get even
more people in the
system

Integrate with
other systems

Integrate with even more systems

System to support
my business
processes

How to get more
people in the
system

How to get even
more people in the
system

Integrate with
other systems

Integrate with even
more systems

Improve performance

System to support
my business
processes

How to get more
people in the
system

How to get even
more people in the
system

Integrate with
other systems

Integrate with even
more systems

Improve
performance

Provide world-class scalability

System to support
my business
processes

How to get more
people in the
system

How to get even
more people in the
system

Integrate with
other systems

Integrate with even
more systems

Improve
performance

Provide world-class
scalability

Allow business-process consistent interfacing

System to support
my business
processes

How to get more
people in the
system

How to get even
more people in the
system

Integrate with
other systems

Integrate with even
more systems

Improve
performance

Provide world-class
scalability

Allow business-
process consistent
interfacing

Simplify role-tailoring

System to support
my business
processes

How to get more
people in the
system

How to get even
more people in the
system

Integrate with
other systems

Integrate with even
more systems

Improve
performance

Provide world-class
scalability

Allow business-
process consistent
interfacing

Simplify role-
tailoring

Break the Windows
boundaries

Automate
administration

Streamline
upgrades

Make solutions
repeatable

Break the PC
boundaries

Allow zero-
footprint
customizations

Allow zero-
footprint
deployment

System to support
my business
processes

How to get more
people in the
system

How to get even
more people in the
system

Integrate with
other systems

More development
APIs

Integrate with even
more systems

Improve
performance

Provide world-class
scalability

Allow business-
process consistent
interfacing

Improved
development
environment

Simplify role-
tailoring

Break the Windows
boundaries

Automate
administration

Streamline
upgrades

Extending client
capabilities

Make solutions
repeatable

Break the PC
boundaries

Allow zero-
footprint
customizations

Allow zero-
footprint
deployment

Extending client
capabilities in the
web client

Simplify interfacing
from outside

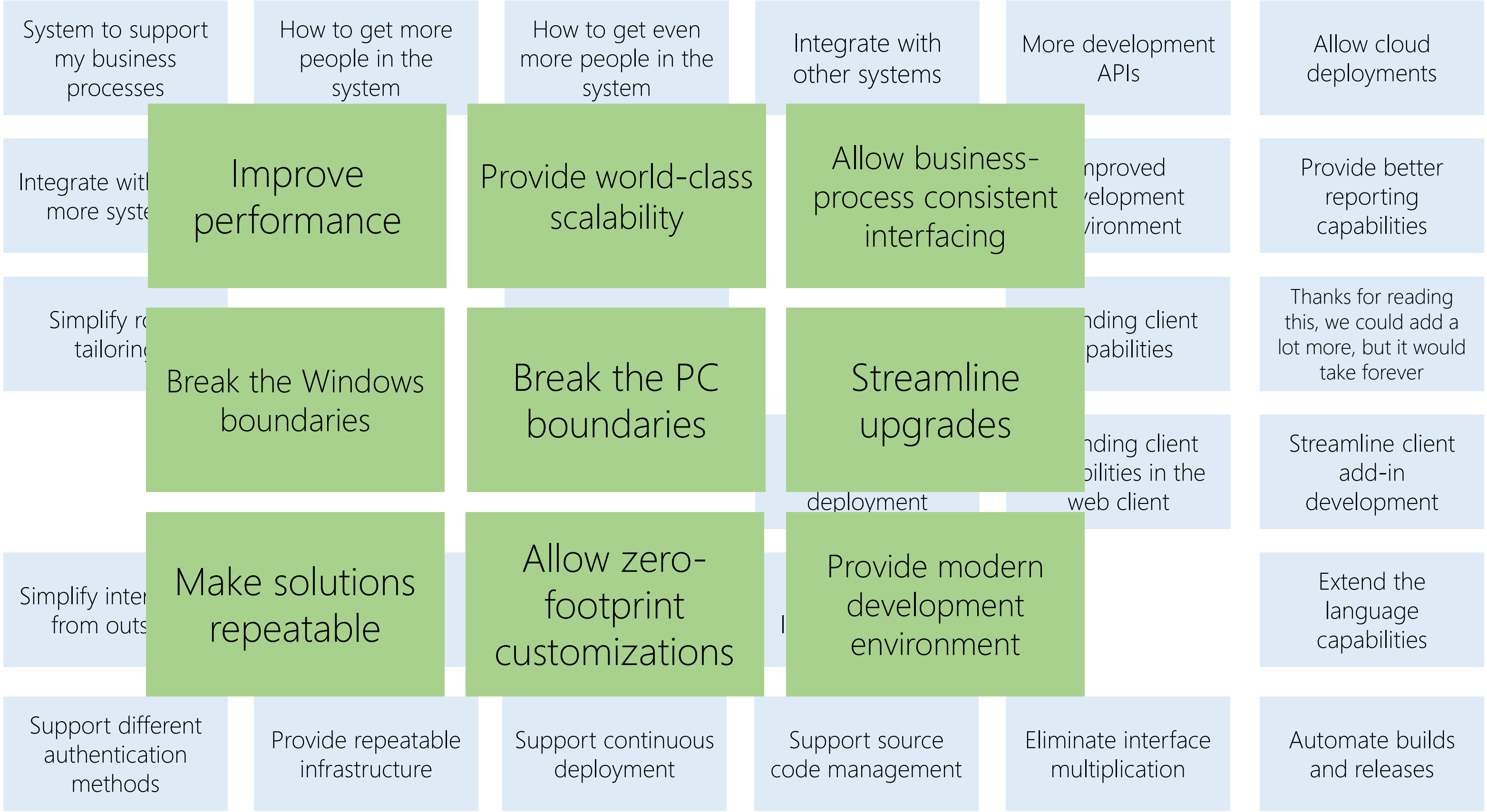
Support mobile
phones

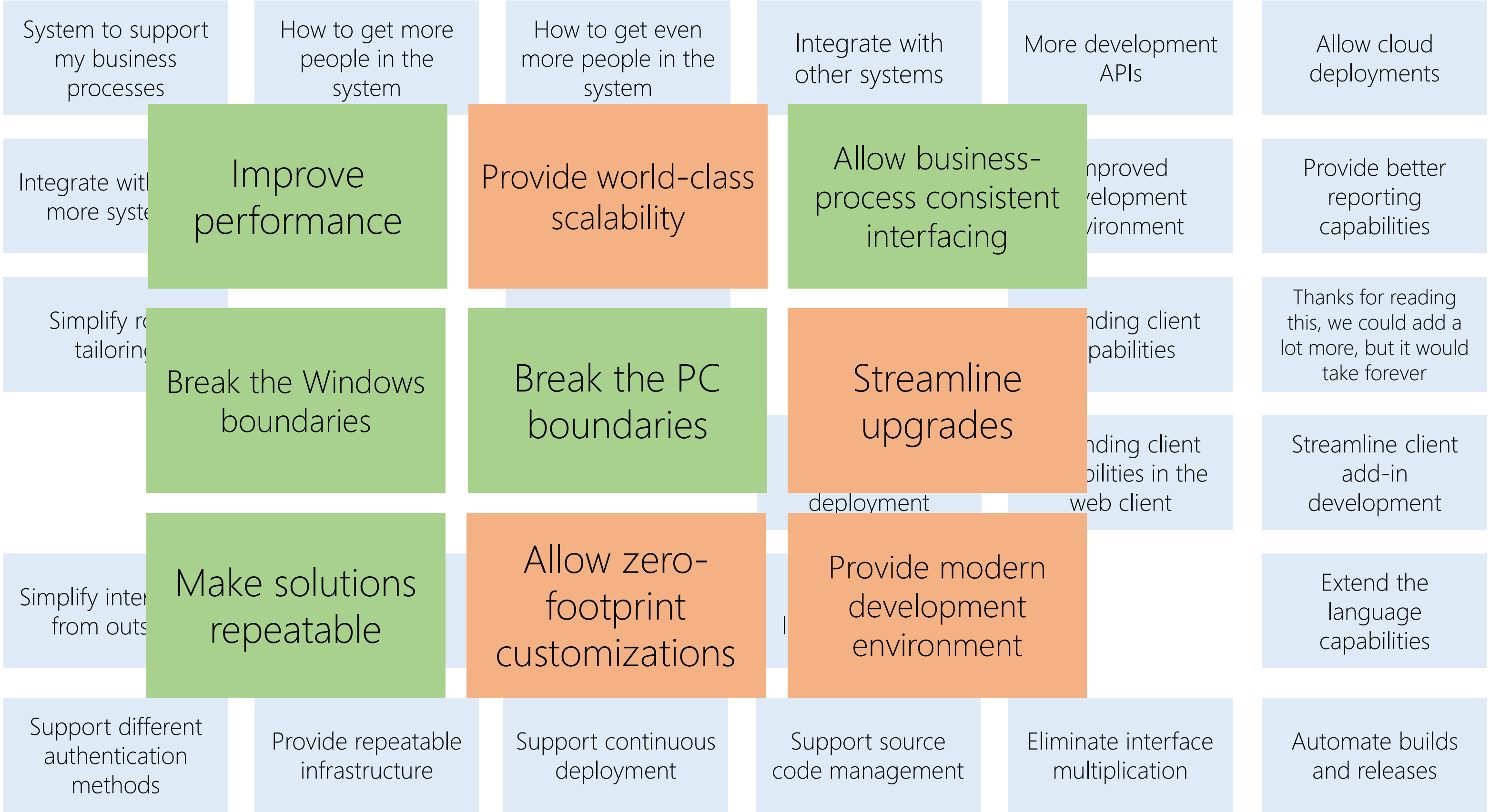
Access client-side
hardware

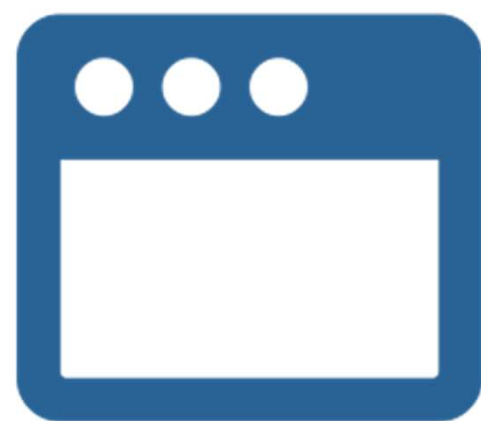
Provide system-
level notifications

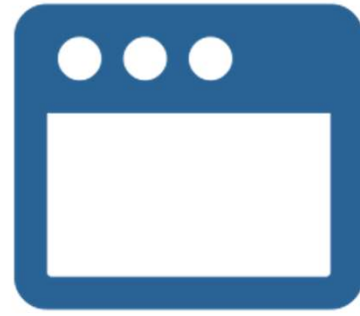
Provide modern
development
environment

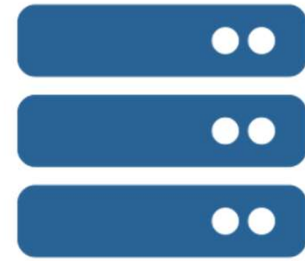
System to support my business processes	How to get more people in the system	How to get even more people in the system	Integrate with other systems	More development APIs	Allow cloud deployments
Integrate with even more systems	Improve performance	Provide world-class scalability	Allow business-process consistent interfacing	Improved development environment	Provide better reporting capabilities
Simplify role-tailoring	Break the Windows boundaries	Automate administration	Streamline upgrades	Extending client capabilities	Thanks for reading this, we could add a lot more, but it would take forever
Make solutions repeatable	Break the PC boundaries	Allow zero-footprint customizations	Allow zero-footprint deployment	Extending client capabilities in the web client	Streamline client add-in development
Simplify interfacing from outside	Support mobile phones	Access client-side hardware	Provide system-level notifications	Provide modern development environment	Extend the language capabilities
Support different authentication methods	Provide repeatable infrastructure	Support continuous deployment	Support source code management	Eliminate interface multiplication	Automate builds and releases

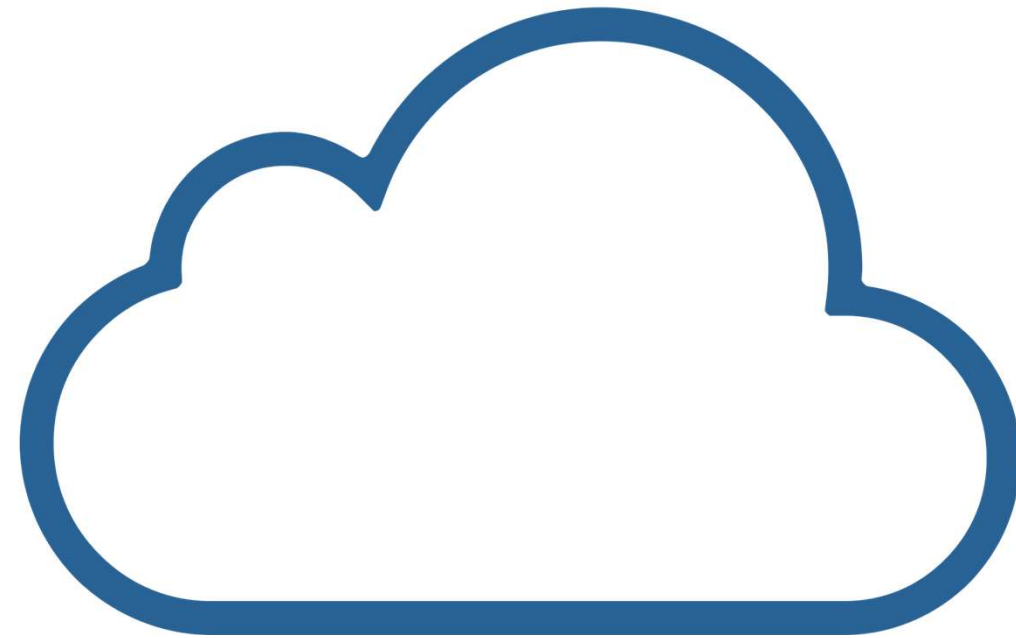
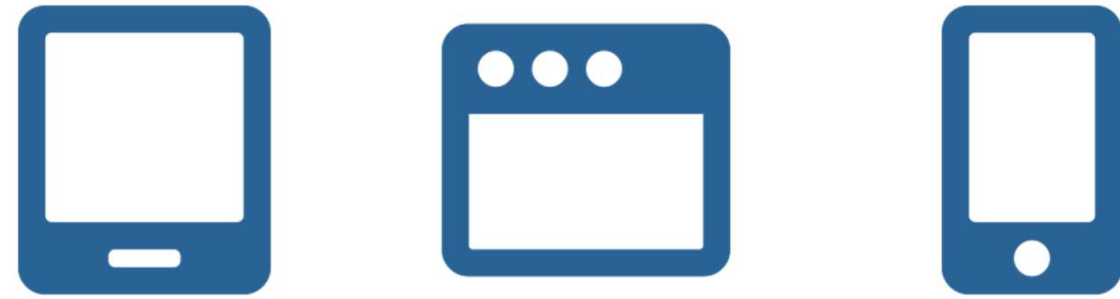




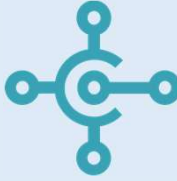



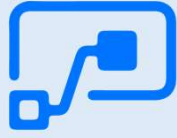























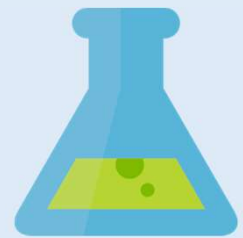








 SQL Azure	 Tablet Client	 NST	Developer services	 Azure DevOps	 PowerBI
 SQL Azure	 Flow	 Office365	 Outlook	 Windows Client	 PowerShell
 API	Server Extensibility	 C/SIDE C/AL	 NAS	 Excel	Task Scheduler
 Machine Learning	 Cognitive Services	 VSCode AL	 Word	Microsoft Graph	 Azure Active Directory
CDS/CDM	 IIS	 Web Client	 Docker	 Phone Client	 Azure Service Bus
 ODATA	 SOAP	Client Extensibility	 SQL Server		



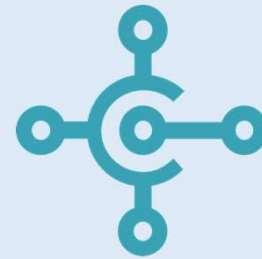
Machine
Learning



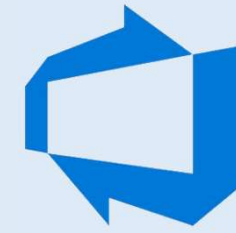
Cognitive
Services



C/SIDE
C/AL



Web
Client



Azure
DevOps

Server
Extensibility

Client
Extensibility



Windows
Client



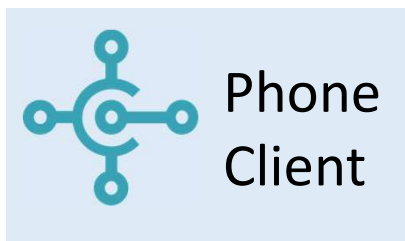
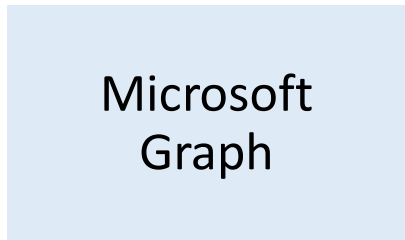
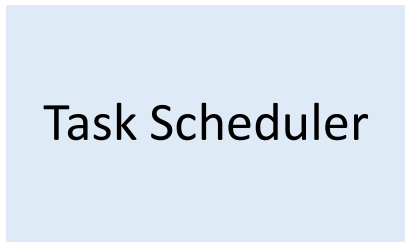
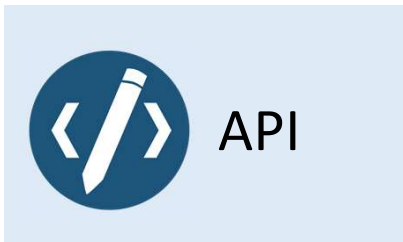
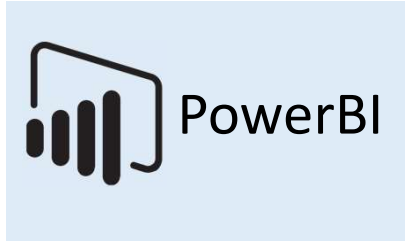
VSCode
AL

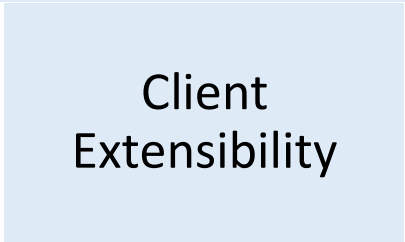
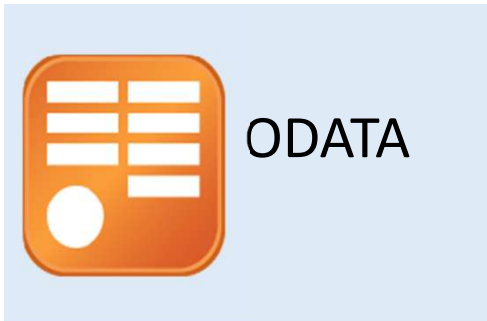
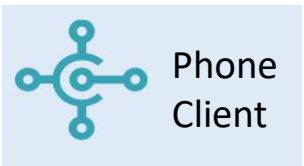
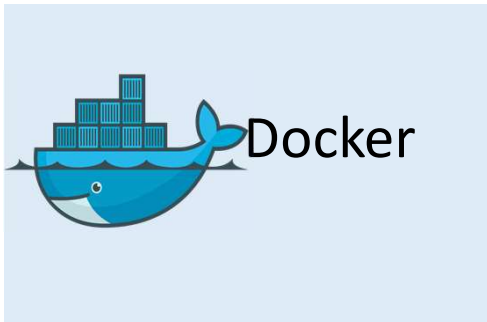
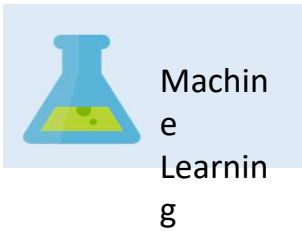
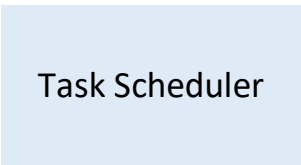
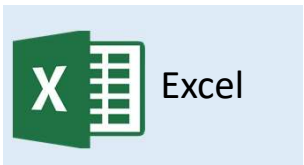
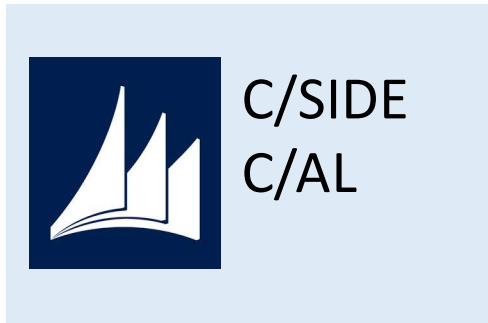
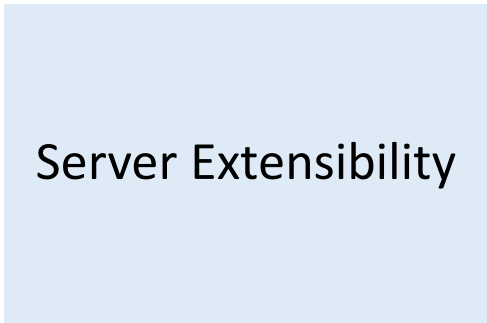
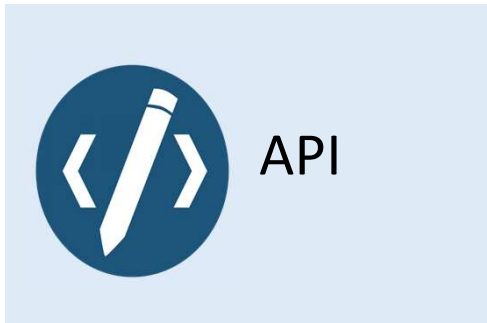
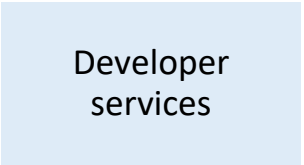


Docker



PowerShell







API

Server
Extensibility



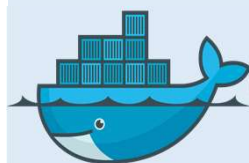
C/SIDE
C/AL



Azure
Service
Bus



Web
Client



Docker



Windows
Client



Azure
DevOps



ODATA



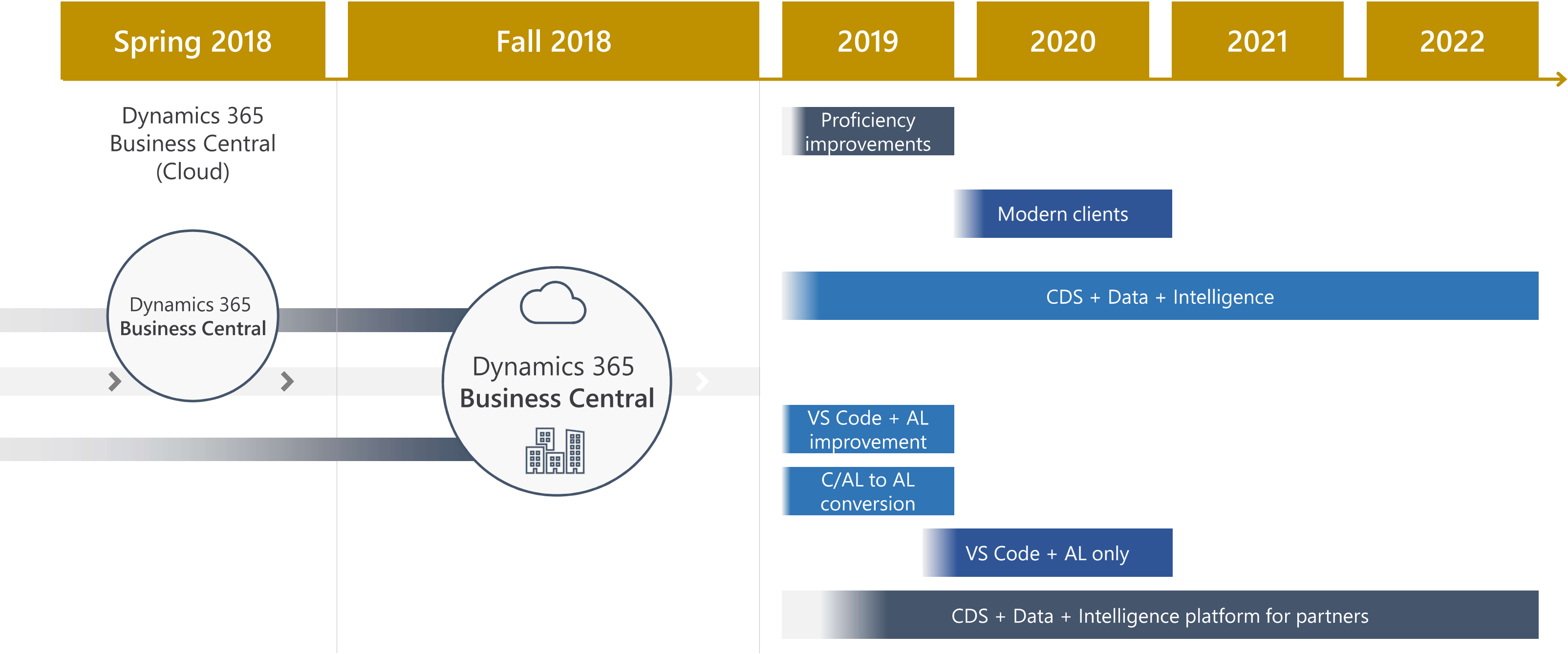
SOAP

Client
Extensibility



PowerShell

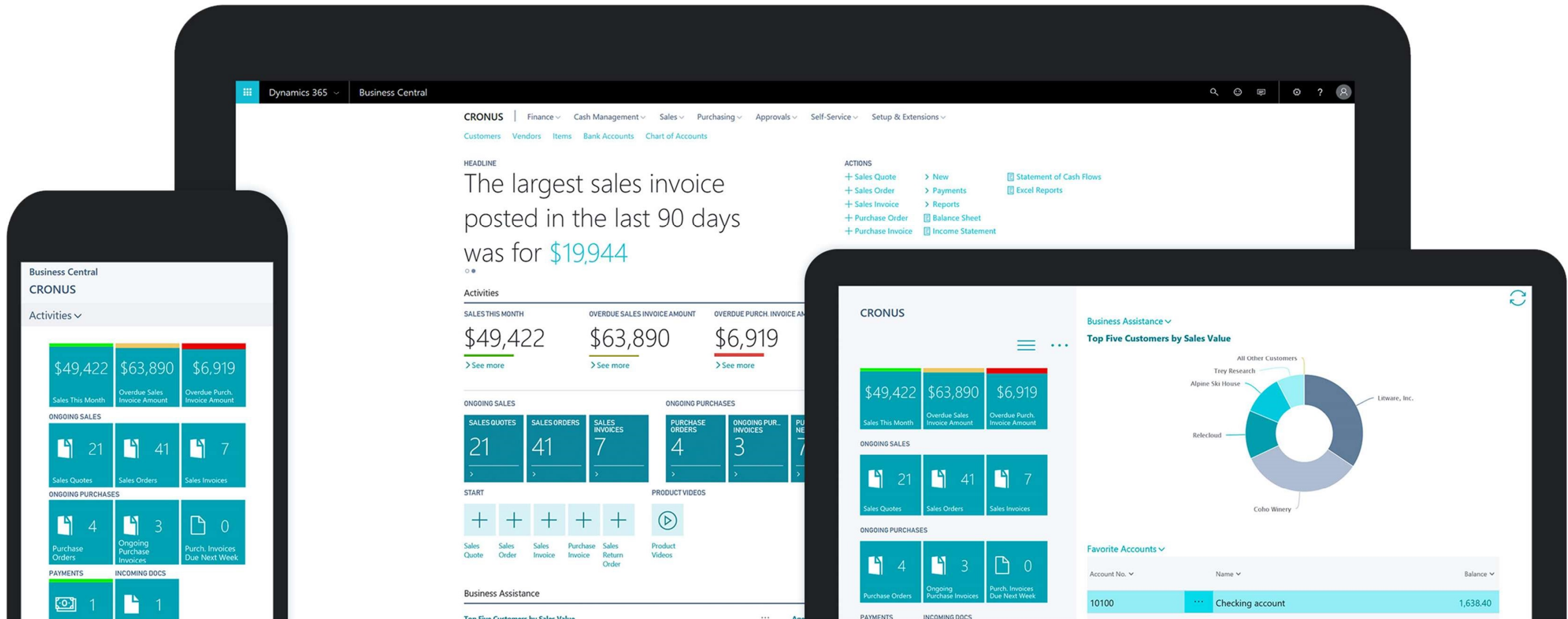
Going foward



Going foward

Proficiency improvements

Modern clients



HEADLINE

The largest sales invoice posted in the last 90 days was for **\$19,944**

- ACTIONS
- + Sales Quote
 - + Sales Order
 - + Sales Invoice
 - + Purchase Order
 - + Purchase Invoice
 - > New
 - > Payments
 - > Reports
 - Balance Sheet
 - Income Statement
 - Statement of Cash Flows
 - Excel Reports

Activities

SALES THIS MONTH	OVERDUE SALES INVOICE AMOUNT	OVERDUE PURCH. INVOICE AMOUNT
\$49,422	\$63,890	\$6,919
> See more	> See more	> See more

ONGOING SALES

SALES QUOTES	SALES ORDERS	SALES INVOICES
21	41	7
>	>	>

ONGOING PURCHASES

PURCHASE ORDERS	ONGOING PURCH. INVOICES	PURCH. INVOICES DUE NEXT WEEK
4	3	7
>	>	>

START

+ Sales Quote	+ Sales Order	+ Sales Invoice	+ Purchase Invoice	+ Sales Return Order	Product Videos
---------------	---------------	-----------------	--------------------	----------------------	----------------

Business Assistance

Top Five Customers by Sales Value

CRONUS

\$49,422	\$63,890	\$6,919
Sales This Month	Overdue Sales Invoice Amount	Overdue Purch. Invoice Amount

ONGOING SALES

21	41	7
Sales Quotes	Sales Orders	Sales Invoices

ONGOING PURCHASES

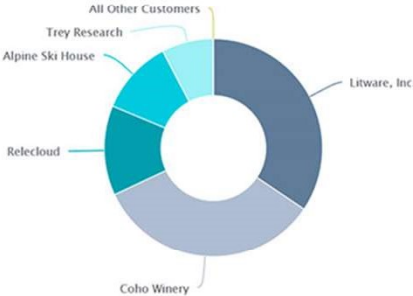
4	3	0
Purchase Orders	Ongoing Purchase Invoices	Purch. Invoices Due Next Week

PAYMENTS

INCOMING DOCS

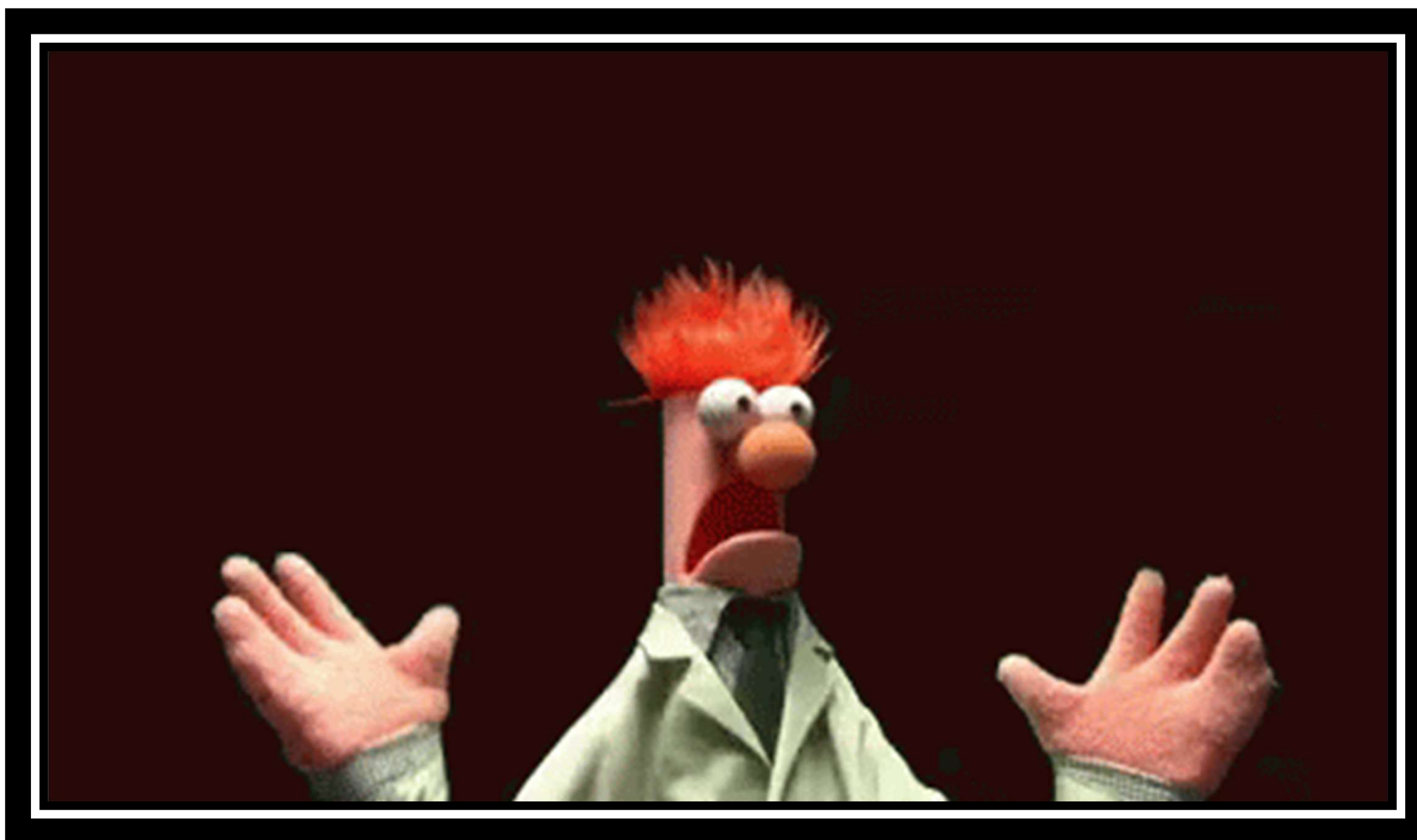
Business Assistance

Top Five Customers by Sales Value



Favorite Accounts

Account No.	Name	Balance
10100	Checking account	1,638.40

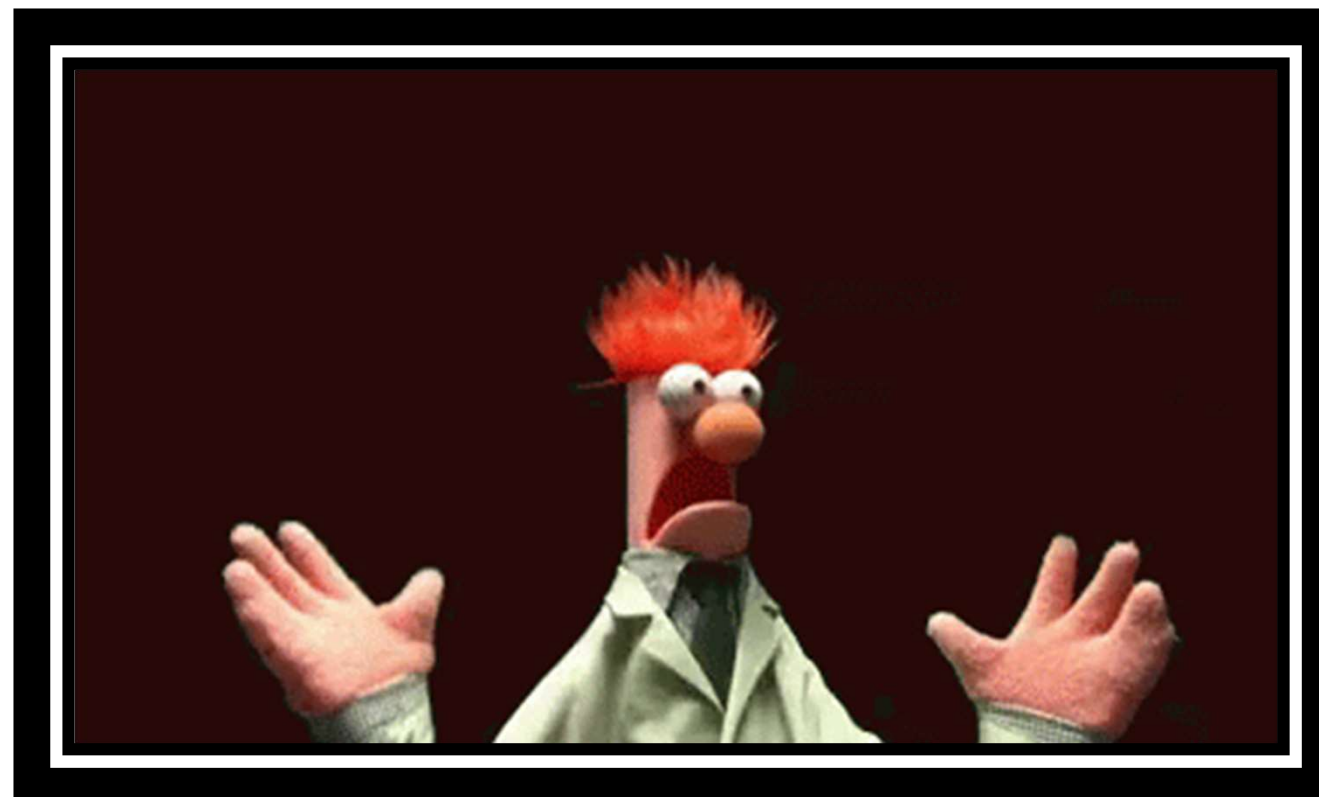


Going forward

Modern clients only

- Universal Client
- Web Client
- Phone Client
- Tablet Client

=> No Windows Client



JavaScript



If you want to invest in one single language
to boost your technological reach,
go for JavaScript



Power of JavaScript

Access entire client, no limits

Full control of the UI

Full stack of cutting-edge web technologies

Independent on NAV process



A vastly different language...



TRUTHY / FALSY

**BECAUSE TRUE AND FALSE
ARE JUST NOT SPECIFIC ENOUGH**

Some best practices

#1 Get to know the language

Do event-driven architecture

Pass control reference out

Take care of front-end calls

Take advantage of JSON



... even though it's a crazy language...

... it's a powerful language...



A brave claim

*Inclusion of JavaScript into the
NAV development stack
is as important as
the transition from C/AL to AL*



What would be really cool in the future...

ES6 support

Callbacks in AL

Permanent JS layer



PowerShell

What did PowerShell ever do for us?

Installation

Comparison &
Merge

Administration

Deployment

Security

Backups

Upgrade



How we did things without PowerShell

Customer Installation	Backups	Development Environment	Customer Installation	Customer Installation	Customer Installation	Customer Installation	Customer Installation	Customer Installation
Deployment	Security	Deployment	Deployment	Deployment	Deployment	Deployment	Deployment	Deployment
Backups	Upgrade	Backups	Backups	Backups	Backups	Backups	Backups	Backups
Security	Security	Security	Security	Security	Security	Security	Security	Security
Upgrade / Merge	Upgrade / Merge	Upgrade / Merge	Upgrade / Merge	Upgrade / Merge	Upgrade / Merge	Upgrade / Merge	Upgrade / Merge	Upgrade / Merge
Test Environment	Test Environment	Test Environment	Test Environment	Test Environment	Test Environment	Test Environment	Test Environment	Test Environment
Development Environment	Administration	Development Environment	Security	Development Environment	Development Environment	Development Environment	Development Environment	Development Environment
Customer Installation	Customer Installation	Customer Installation	Installation	Customer Installation	Customer Installation	Customer Installation	Customer Installation	Customer Installation
Deployment	Deployment	Deployment	Deployment	Deployment	Deployment	Deployment	Deployment	Deployment
Backups	Backups	Backups	Backups	Backups	Backups	Backups	Comparison & Merge	Backups



FAKE BOX ALERT!



How we did things without PowerShell

Customer Installation	Backups	Development Environment	Customer Installation	Customer Installation	Customer Installation	Customer Installation	Customer Installation	Customer Installation
Deployment	Security	Deployment	Deployment	Deployment	Deployment	Deployment	Deployment	Deployment
Backups	Upgrade	Backups	Backups	Backups	Backups	Backups	Backups	Backups
Security	Security	Security	Security	Security	Security	Security	Security	Security
Upgrade / Merge	Upgrade / Merge	Upgrade / Merge	Upgrade / Merge	Upgrade / Merge	Upgrade / Merge	Upgrade / Merge	Upgrade / Merge	Upgrade / Merge
Test Environment	Test Environment	Test Environment	Test Environment	Test Environment	Test Environment	Test Environment	Test Environment	Test Environment
Development Environment	Administration	Development Environment	Security	Development Environment	Development Environment	Development Environment	Development Environment	Development Environment
Customer Installation	Customer Installation	Customer Installation	Installation	Customer Installation	Customer Installation	Customer Installation	Customer Installation	Customer Installation
Deployment	Deployment	Deployment	Deployment	Deployment	Deployment	Deployment	Deployment	Deployment
Backups	Backups	Backups	Backups	Backups	Backups	Backups	Comparison & Merge	Backups



PowerShell since NAV 2013

Out-of-the-box **PowerShell** commandlets for mainly **NST Server Administration**



Since NAV 2013

Out-of-the-box **PowerShell** commandlets for mainly **NST Server Administration**



powershell since NAV 2013

Out-of-the-box **PowerShell** commandlets for mainly **NST Server Administration**

Administration

Web Services

Companies

Security

...



Somewhat later (NAV 2013 R2)

Out-of-the-box **PowerShell** commandlets for mainly **NST Server Administration**

Administration

Web Services

Companies

Security

Object Merge

Language Mgt

...



Currently

Administration	Web Services	Companies	Security
Object Merge	Language Mgt	Docker	Upgrading
Source Code Analysis	CI/CD	...	



Currently

Administration

Web Services

Companies

Security

Object Merge

Language Mgt

Docker

Upgrading

Source Code
Analysis

CI/CD

...



Microsoft.Dynamics.Nav.Model.Tools

Used by the PowerShell Merge Tools (modeltools)

Builds an object model from a txt file

Does not include the actual code



Source Code
Analysis



We applied some magic....

New object model, based on modeltools
& **Extended** it with **source code object model**

Made that available in **PowerShell**

Build scripts to **automate Source Code Analysis**

Source Code
Analysis



What about...

Administration

Web Services

Companies

Security

Object Merge

Language Mgt

Docker

Upgrading

Source Code
Analysis

CI/CD

...



What about...

Administration

Web Services

Companies

Security

Object Merge

Language Mgt

Upgrading

Source Code
Analysis

CI/CD

...

Docker



Going forward

- On Prem Server Administration
- Local DEV environment
- Docker
- CI/CD
- Source Code Analysis
- ...

Demo

My PowerShell collection

Some scripts I run every day

→ Docker?

→ Upgrade?

→ **Export to AL?**

→ **Test Web Services!**

Docker



Docker = Infrastructure

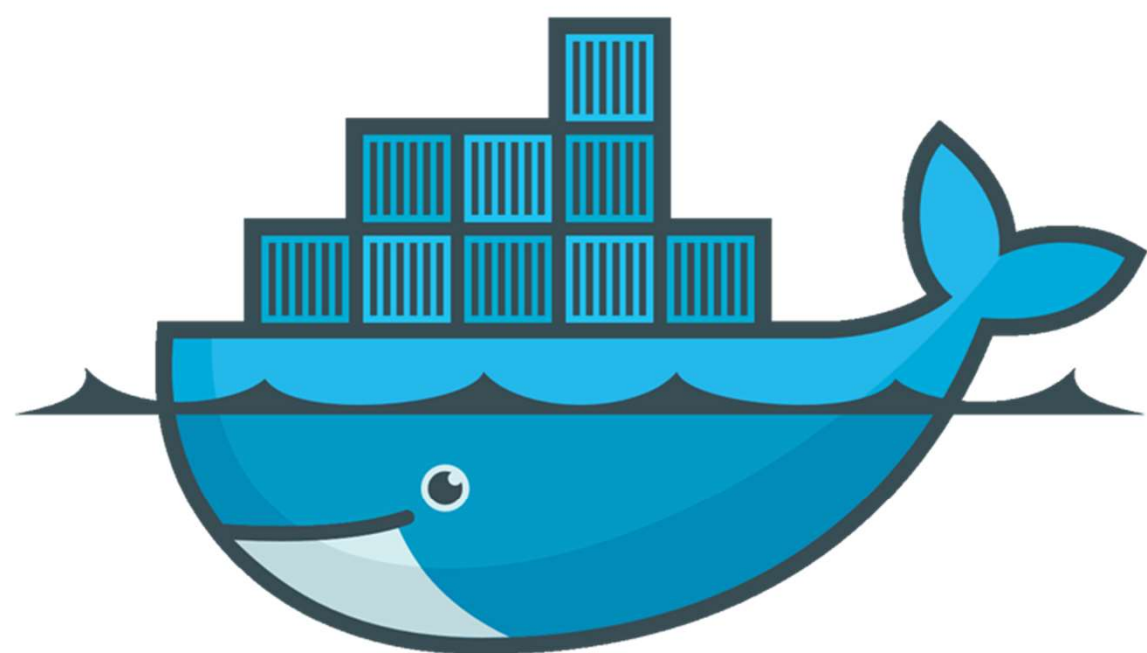
Our life prior to Docker



What were we thinking?



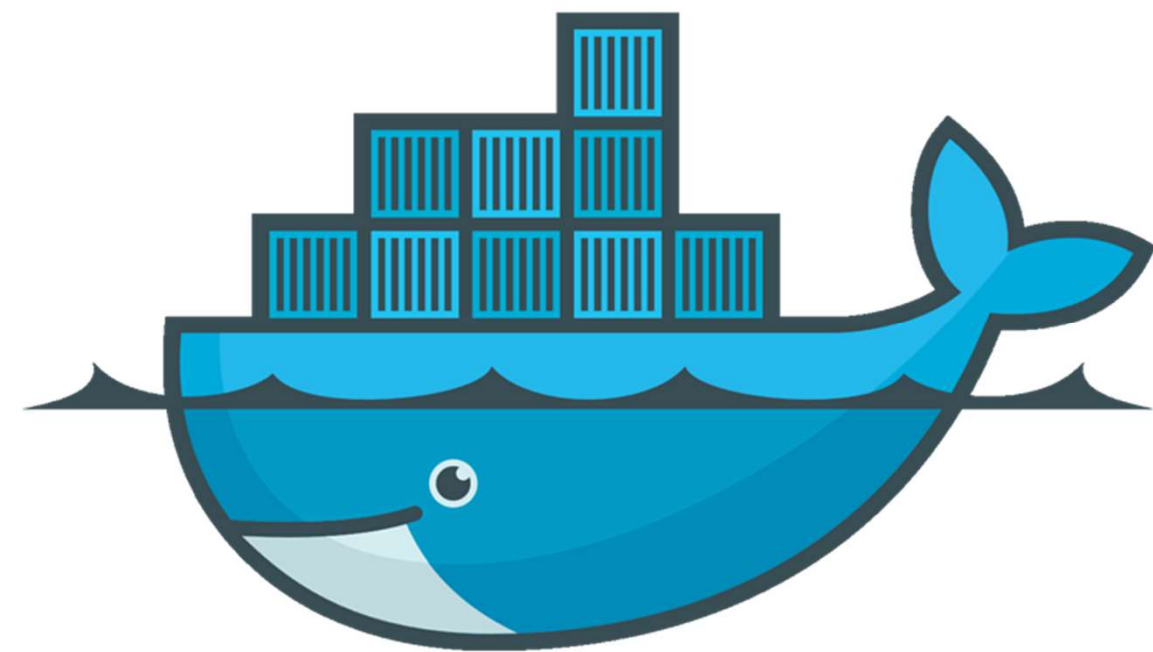
And then there was ...



docker

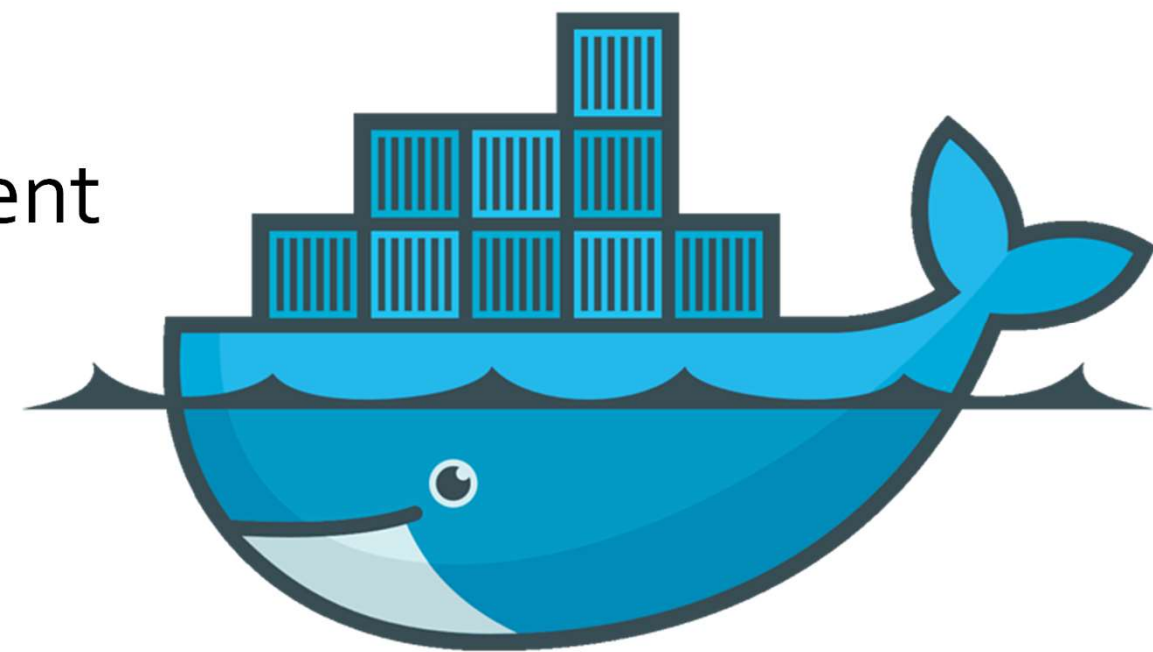
Docker is ...

- Leading cross platform **software container environment**
- Something like a “**virtual machine**”, but
 - Allows apps to use the same windows/linux **kernel** as the host
 - Only requires apps be shipped with things not already running on the host
- **Reduces size and boosts performance**
- Docker is **Open Source**
 - Anyone can contribute to Docker



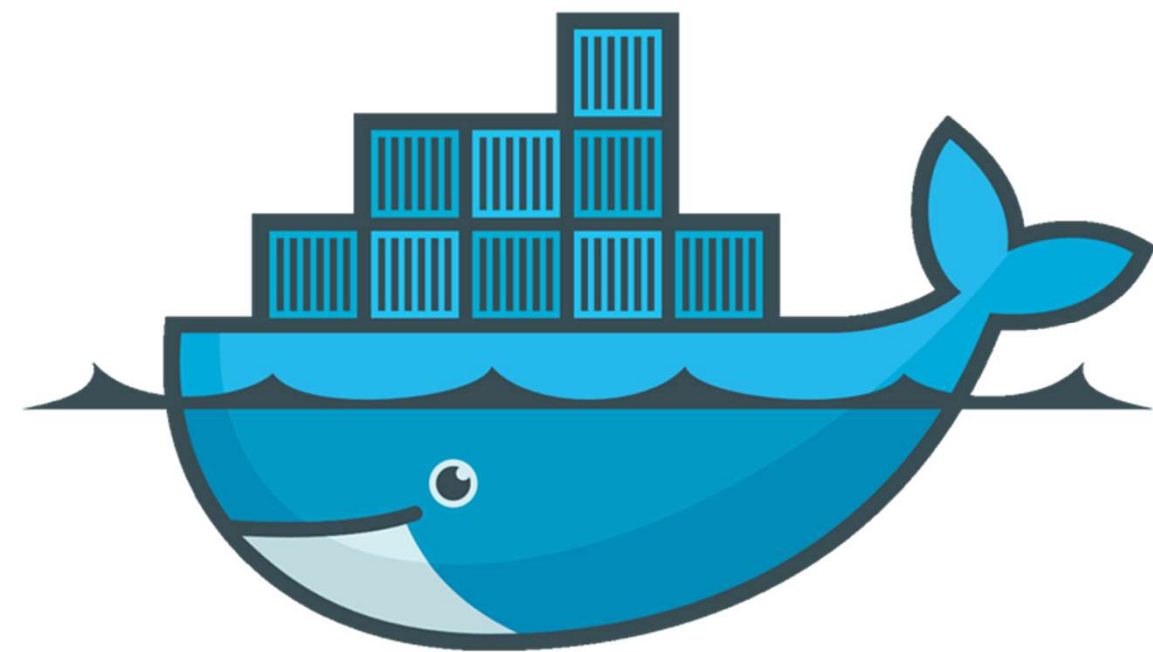
Docker is ...

- Fast
 - Efficient
 - Isolated with shared resources
 - Safe
-
- Your solution for installing (temporary) development environments
 - Your solution for having multiple versions of NAV on one PC
-
- Very interesting for your development environment
 - Very interesting for CI/CD



Docker is ...

- For **Developers**
 - They can focus on writing code
 - No need to worry about the operational system
- For **DevOps**
 - Automate a lot in the development process of software
- For **System Administrators**

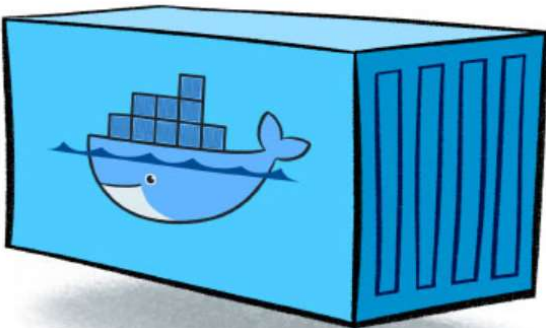
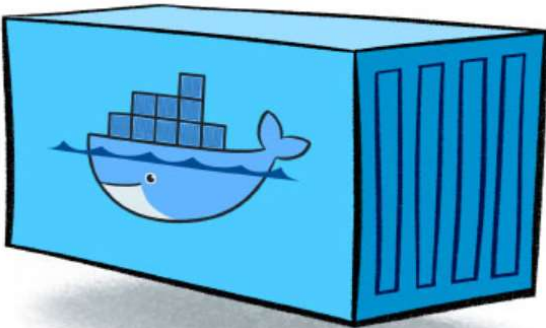
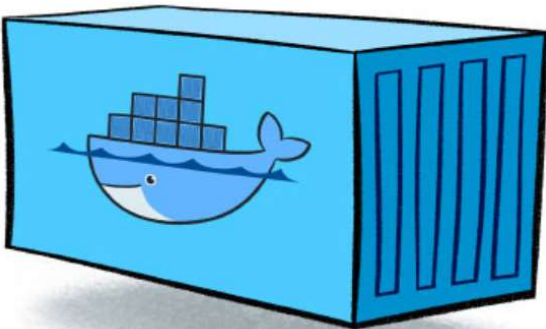


PowerShell & Docker



NAVContainerHelper

Docker Containers



My Working Environment



CRS.NavContainerHelperExtension

Docker Host

Tobias Fenster

GERMANY

Axians Infoma



Tomorrow @ 1:30pm

Real life scenarios and best practices for using NAV on Docker

ROOM 5

SESSION

LEVEL: 300 - ADVANCED

In this session you will see demos and implementation details of real life scenarios and best practices for using NAV/BC on Docker. The scenarios covered are:

- Self-service with containers: How to provide containers to developers and product managers through an easy to use web interface
- Multi-container environments: In some cases you need to run multiple containers at once and you will see how this can easily be accomplished with Docker compose
- Automated extension 2.0 builds: Build your 2.0 extension using a CI/CD pipeline can greatly benefit from Docker containers including multi-stage images
- Using Azure Container Instances: If you just want to run a NAV/BC container without having to worry about the underlying infrastructure, Azure Container Instances are the solution

Tobias Fenster

GERMANY

Axians Infoma



.NET



Why was .NET needed in NAV



Calling outside NAV



Automation was old
.NET was natural evolution



If Windows can do it,
.NET can do it

Why was .NET needed in NAV



Calling outside NAV

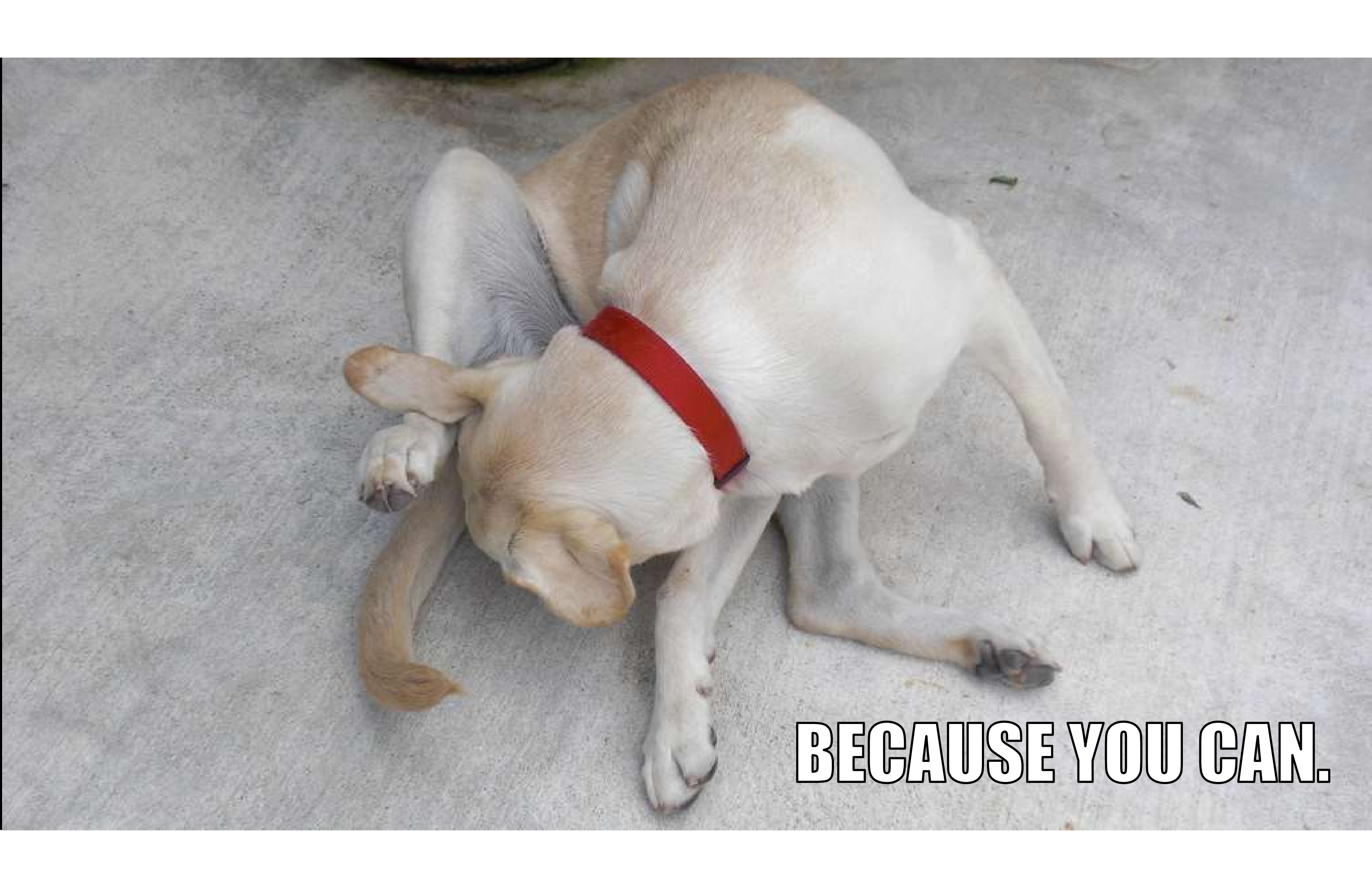


Automation was old
.NET was natural evolution



If Windows can do it,
.NET can do it

NAV is already running on .NET anyway



BECAUSE YOU CAN.

Two flavors of .NET

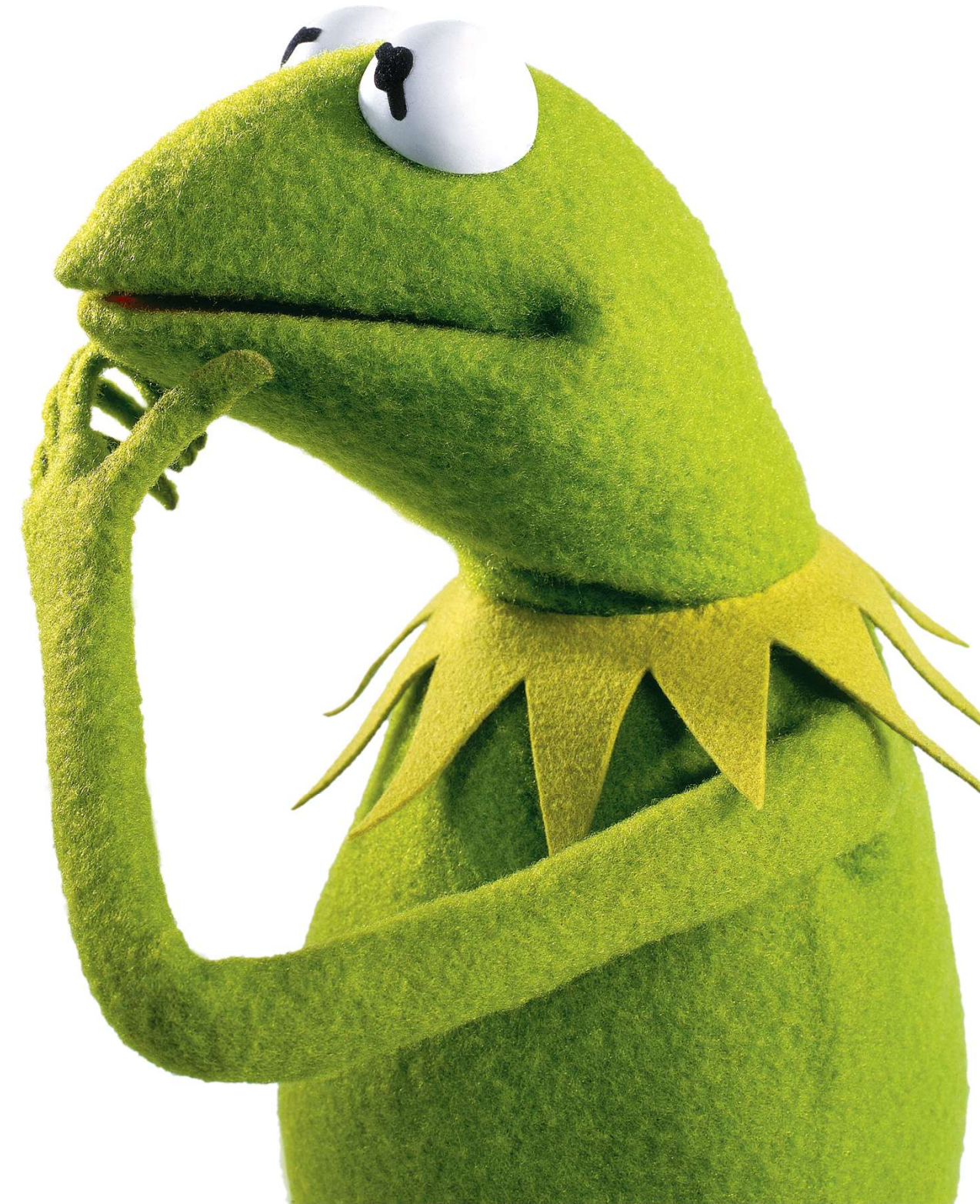
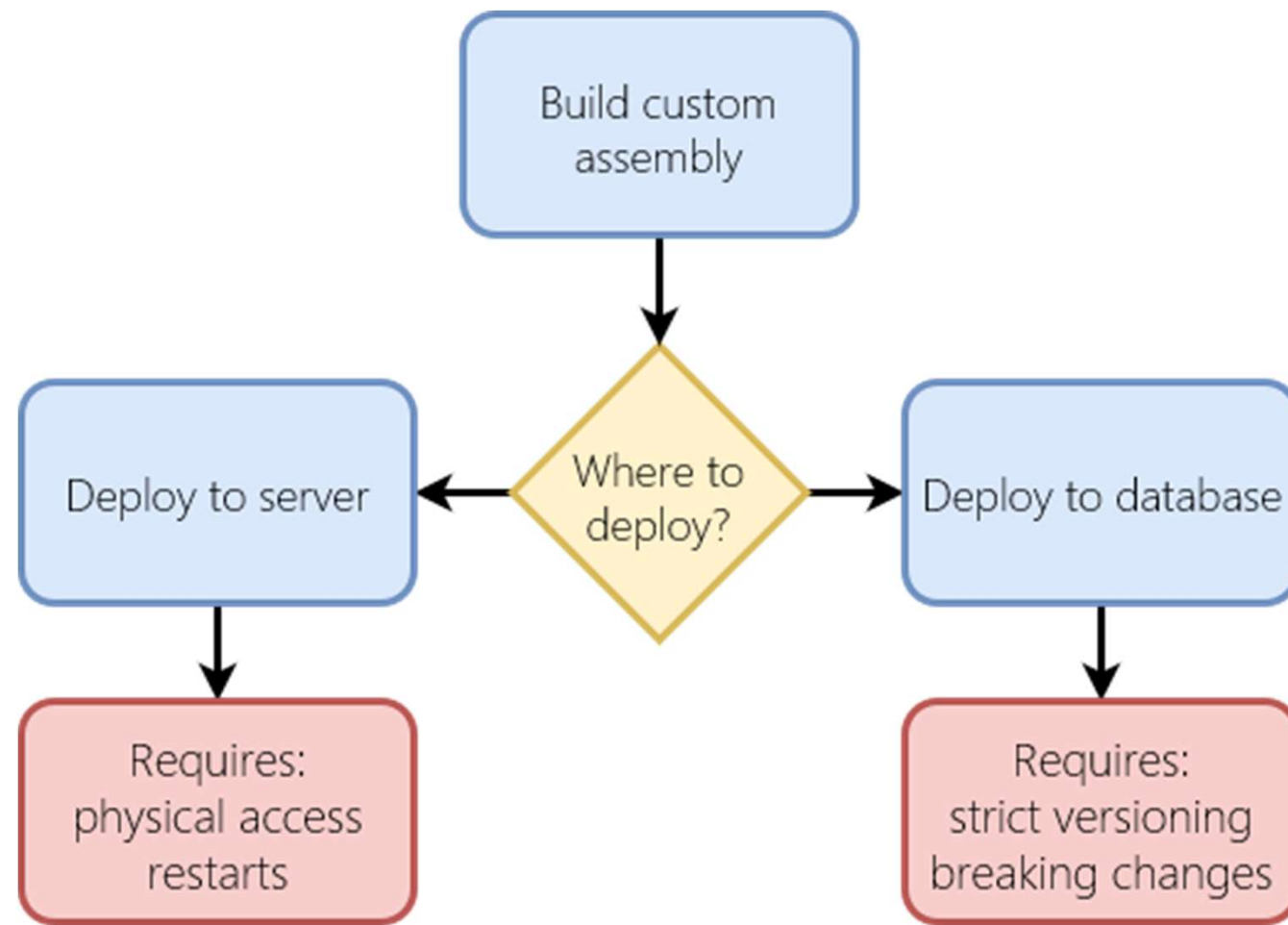






The problem? Reflection and boxing.

So let's do it in C#



Why is it a bad idea to still use .NET



- Code dependency that's managed outside of code
- Cannot ever do it in BC



- Much slower
- More difficult to migrate to Azure Functions
- More difficult to refactor

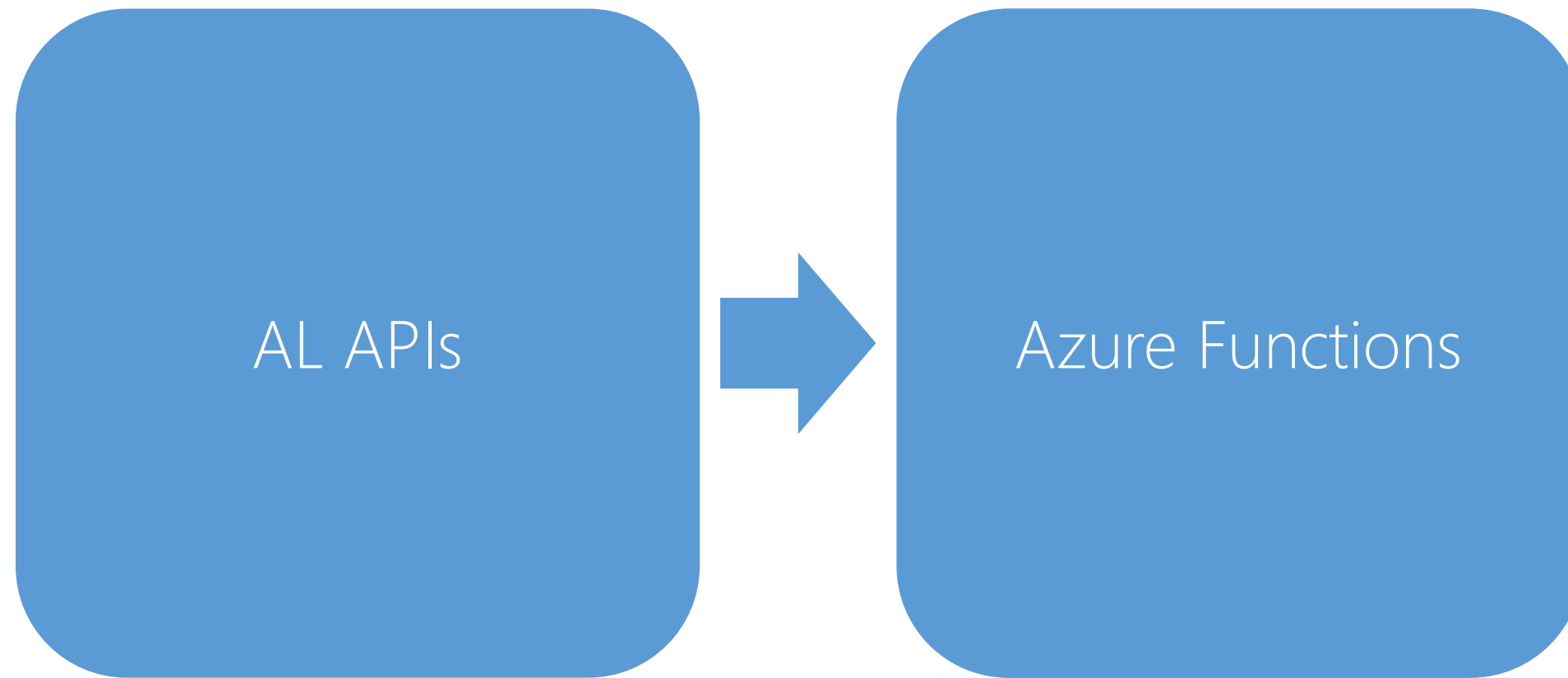
What can we do, then?

What can we do, then?

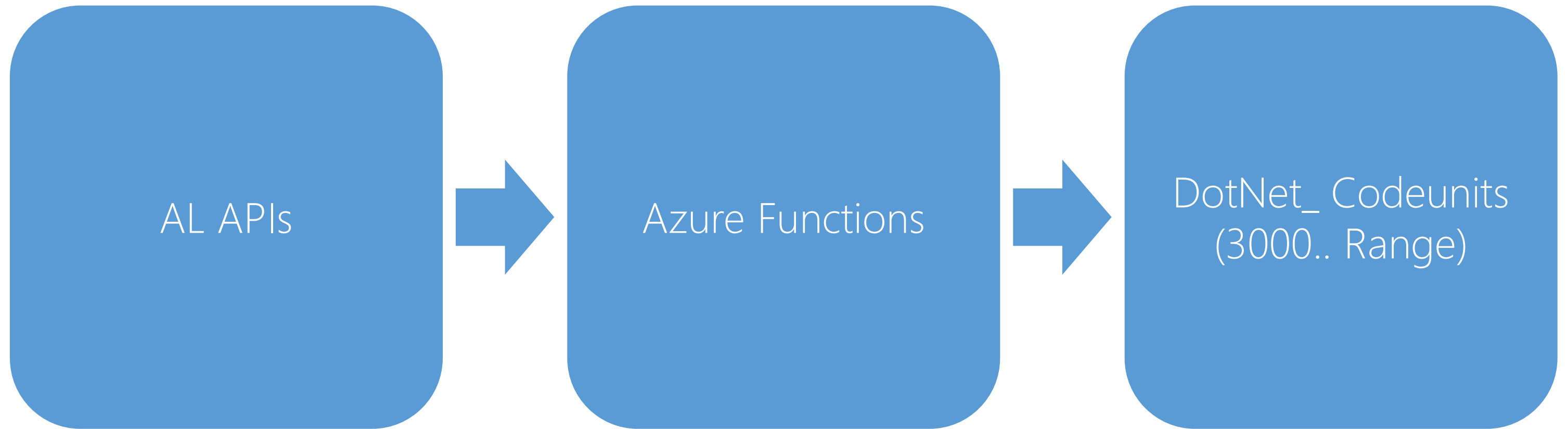


AL APIs

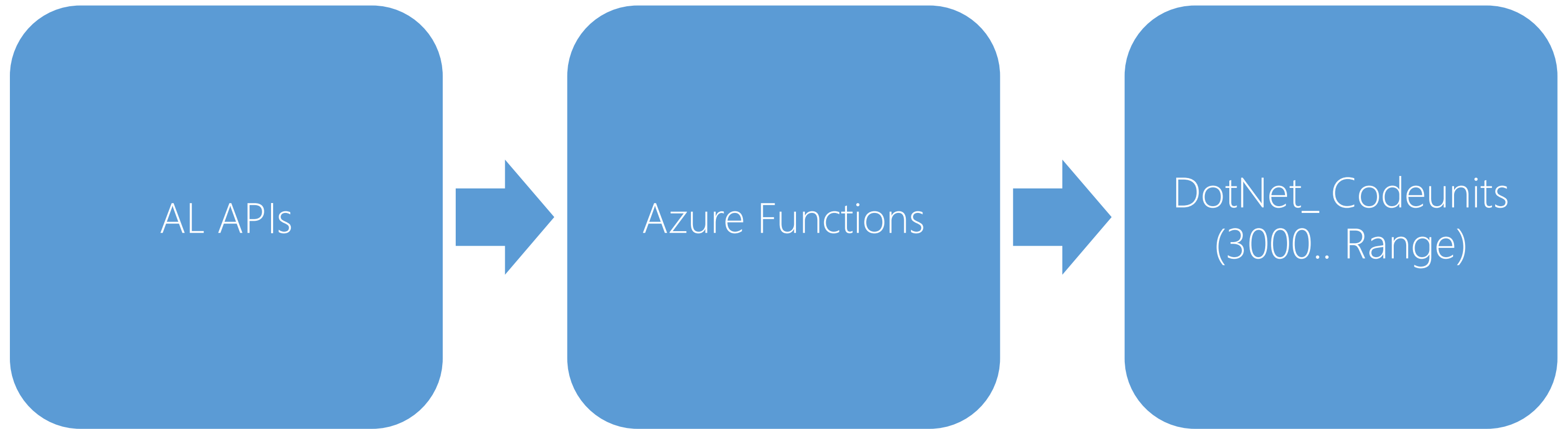
What can we do, then?



What can we do, then?



What can we do, then?



<https://github.com/Microsoft/cal-open-library>

DotNet

Don'tNet

NAVMgt

Goal:

Solve typical problems for NAV partners to monitor service customers

Example:

- Remote Desktop Connection to all NAV related servers
- Manage customer credentials (GDPR)
- Monitor NAV services
- Self healing services
- Scripted Installation @ Customer



NAVMgt



NAV Mgt RoleCenter - Microsoft Dynamics NAV

Home

Home

Search (Ctrl+F3)

NAV Mgt v5.0.1 - iFacto NV

Environment Services

Setup NAV Mgt

Repository Activity

Service Activity

NPS Activity

Refresh

Role Center

Environment Group

Server

Service

Database

NST Service

SQL Service

NAS Services

Changeset

Repositories

NAV Release

RDP Log

Customers

Remote Sessions

NAV Mgt Licence

Two Factor Authentication

REPO Checked Out

NAV Mgt RoleCenter

Management

Filter

Clear Filter

Infrastructure

150

502

999+

Domains

Servers

Users_Groups

NAV Configuration

197

513

316

Clusters

Environments

Licenses

Servers Change Log

Services Change Log

Environment Services

Fully automated Install

Monitoring

Filter

Clear Filter

Management Jobs

999+

0

401

22

946 990

Jobs

Running Jobs

Open Info

Open Alerts

Alerts

Errors

0

18

0

91

0

Server Errors

NST Errors

NAS Errors

SQL Errors

Database Errors

Services By State

999+

999+

999+

341

Services

Running

Stopped

Disabled

iFacto NV

maandag 19 november 2018

WALDO

NAV Mgt RoleCenter - Microsoft Dynamics NAV

Home

Home

Search (Ctrl+F3)

NAV Mgt v5.0.1 - iFacto NV

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341

Services

Running

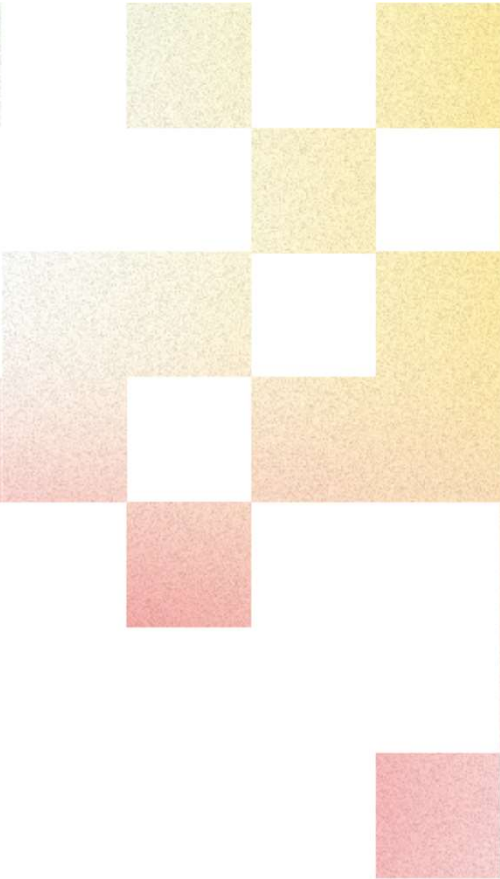
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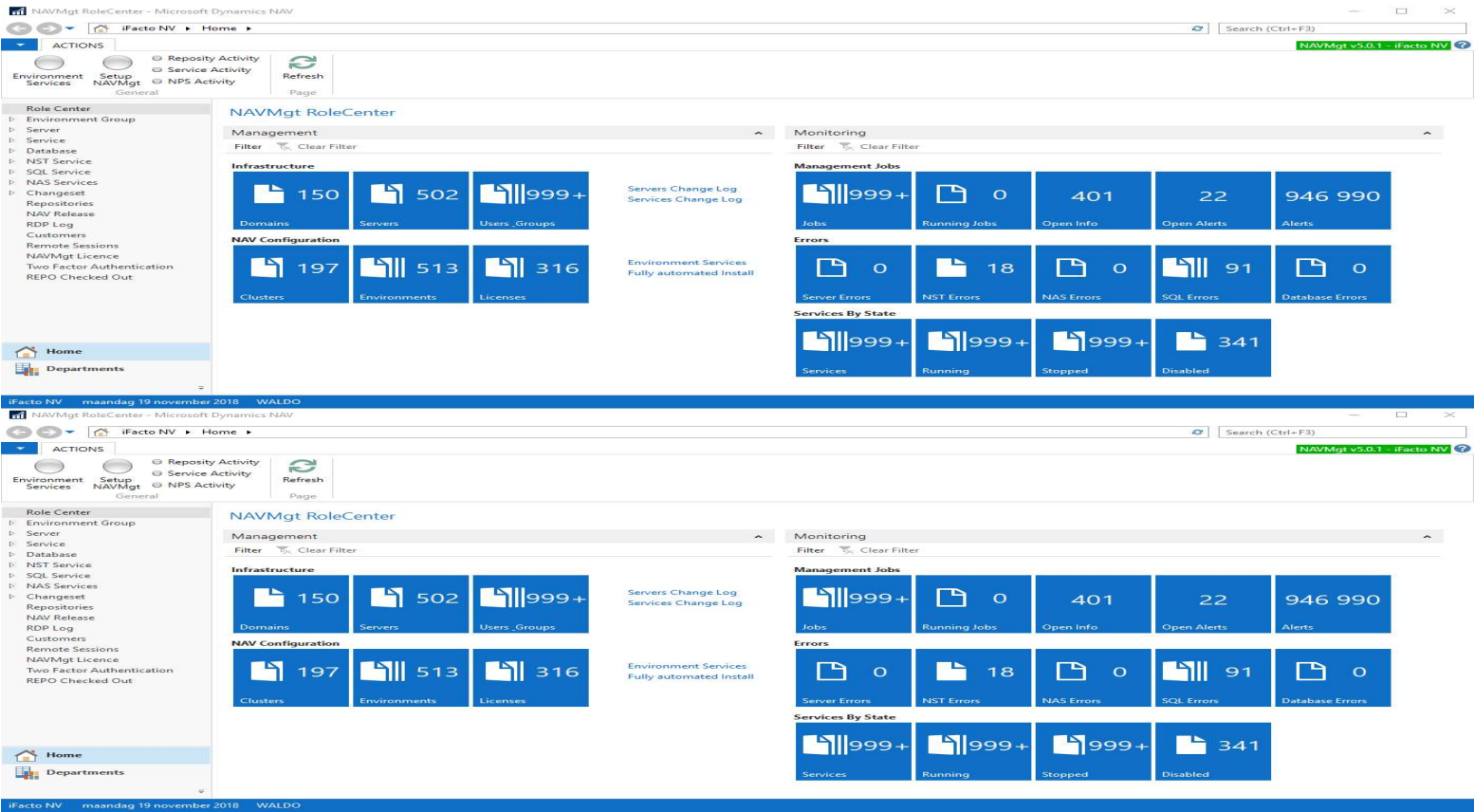
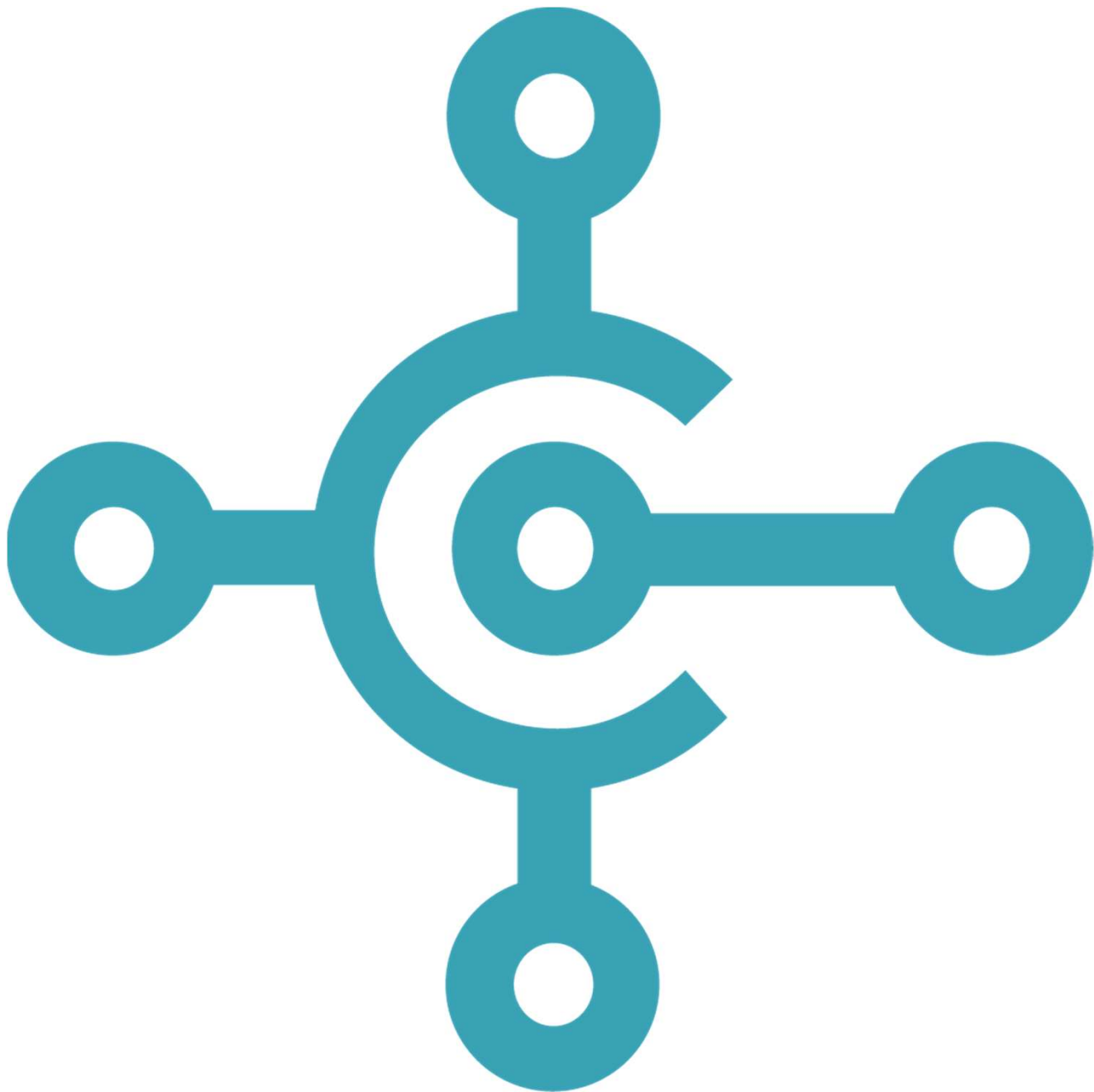
iFacto NV

maandag 19 november 2018

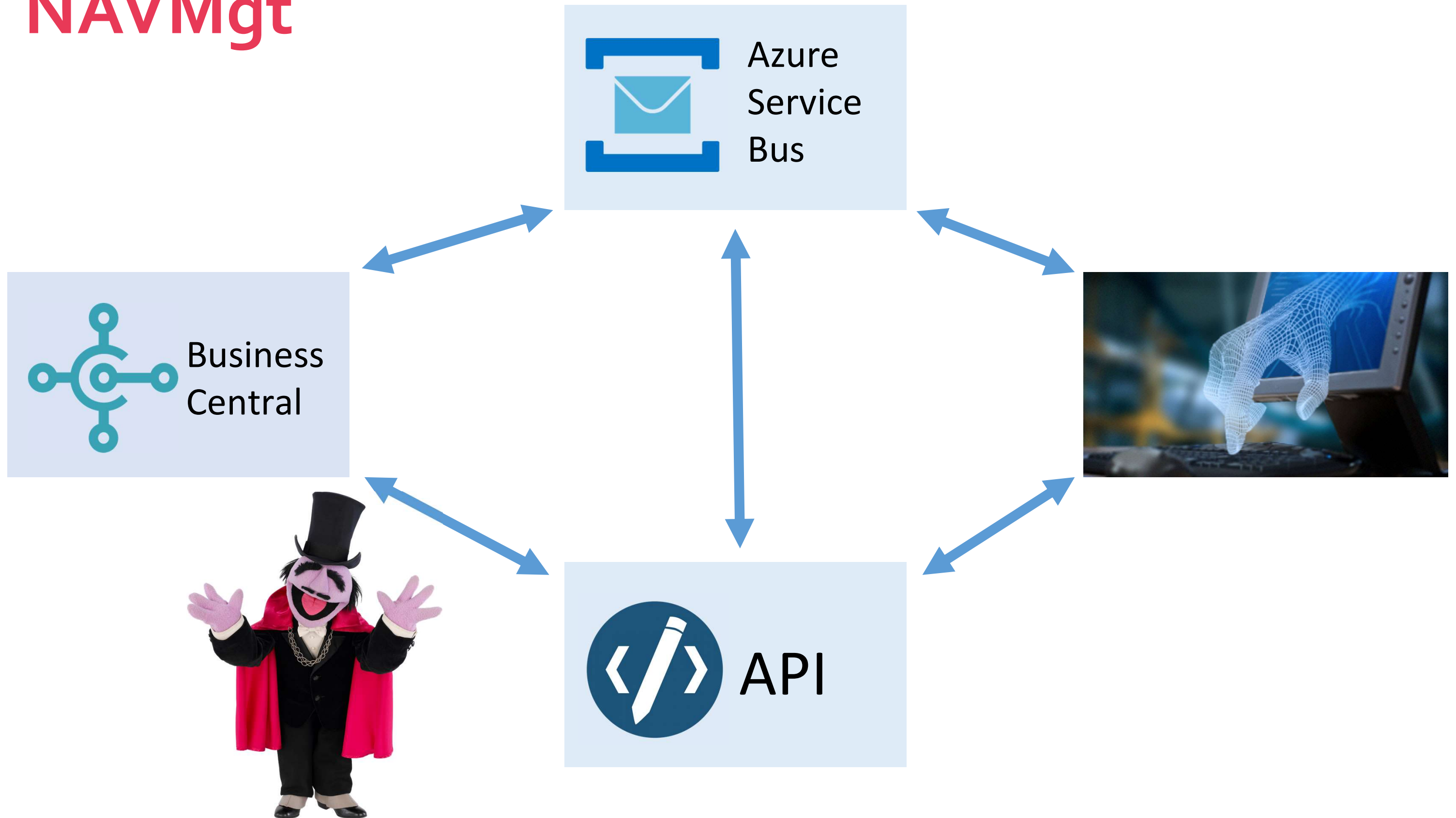
WALDO



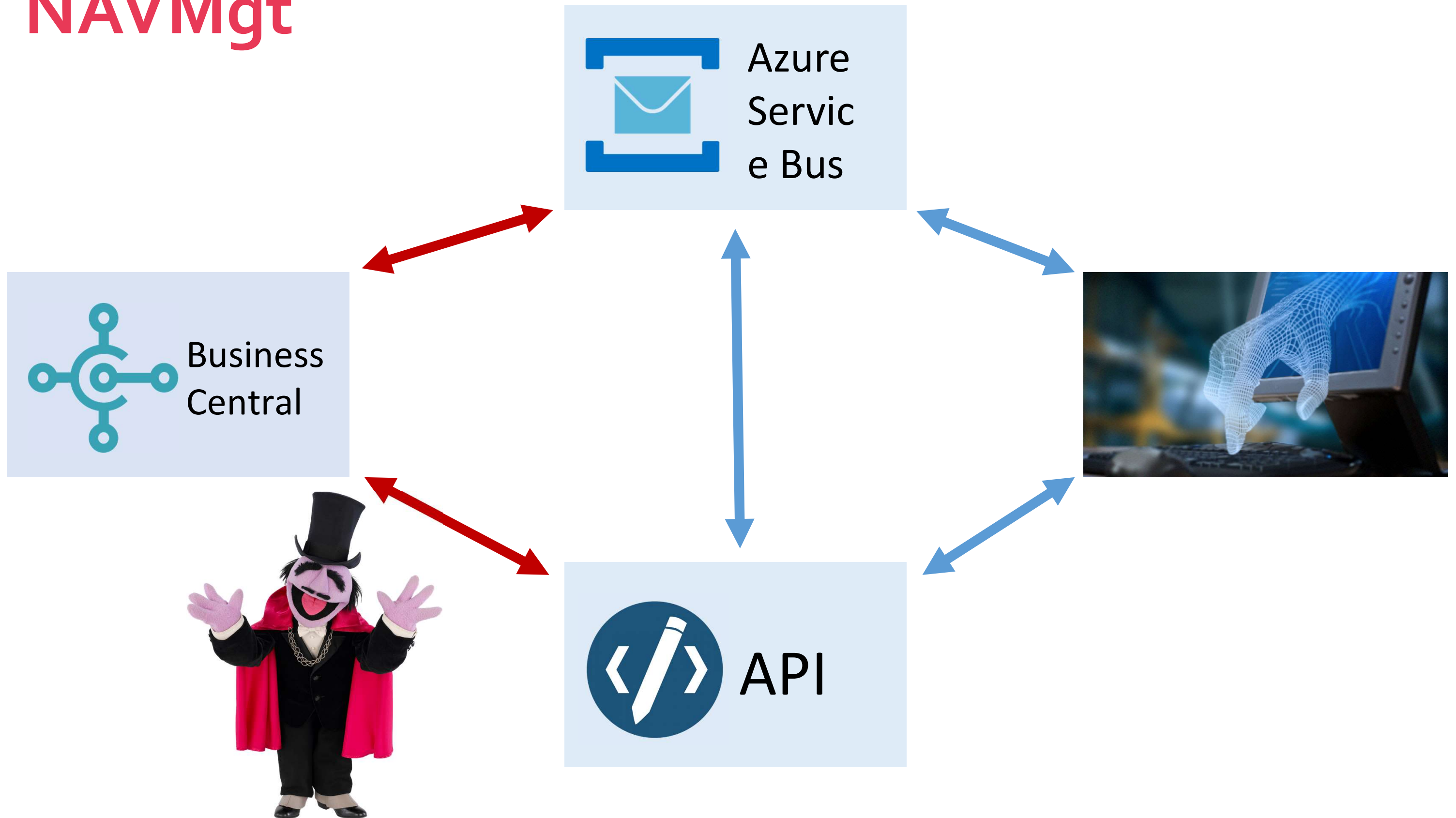
NAVMgt



NAVMgt



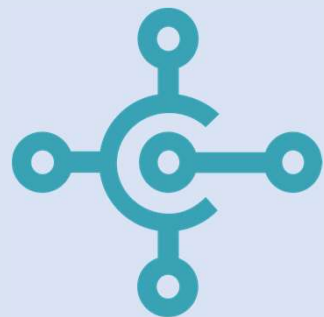
NAVMgt



Let's have a look...

NAV Mgt

Remote connection
AddOn App
PerTenantExtension
No DotNet



Business
Central

```
1 {
2   "id" : "XXXXXXXXXX-XXXX-XXXX-XXXX-XXXXXXXXXXXX",
3   "name" : "SBR",
4   "publisher" : "Bart Bourgeois",
5   "brief" : "",
6   "description" : "",
7   "version" : "1.1.0.0",
8   "privacyStatement" : "",
9   "EULA" : "",
10  "help" : "",
11  "url" : "XXXXXXXXXX",
12  "logo" : "Images\\sbr.png",
13  "capabilities" : [],
14  "dependencies" :
15  [
16    {
17      "appId" : "XXXXXXXXXX-XXXX-XXXX-XXXX-XXXXXXXXXXXX",
18      "name" : "TASKER",
19      "publisher" : "Bart Bourgeois",
20      "version" : "1.0.6.0"
21    }
22  ],
23  "screenshots" : [],
24  "platform" : "13.0.0.0",
25  "application" : "13.0.0.0",
26  "idRange" : {
27    "from" : 90000,
28    "to" : 95999
29  },
30  "features" : ["TranslationFile"],
31  "showMyCode" : true,
32  "runtime" : "2.0",
33  "target" : "Extension"
34 }
```



A title for your API

Account		Show/Hide	List Operations	Expand Operations
NAVMgtCustomers		Show/Hide	List Operations	Expand Operations
GET	/api/NAVMgtCustomers			
POST	/api/NAVMgtCustomers			
DELETE	/api/NAVMgtCustomers/{id}			
GET	/api/NAVMgtCustomers/{id}			
PUT	/api/NAVMgtCustomers/{id}			
SBRAgents		Show/Hide	List Operations	Expand Operations
SBRConnections		Show/Hide	List Operations	Expand Operations
SBRCredentials		Show/Hide	List Operations	Expand Operations
SBRNamespaces		Show/Hide	List Operations	Expand Operations
SBRPlugins		Show/Hide	List Operations	Expand Operations





Azure
Service Bus

Microsoft Azure

Search resources, services, and docs

Home > feedbackqueue

feedbackqueue
Service Bus Queue

Search (Ctrl+ /)

Overview

Diagnose and solve problems

Settings

- Shared access policies
- Metrics (preview)
- Properties
- Locks
- Automation script

Support + troubleshooting

- New support request

Delete

Essentials

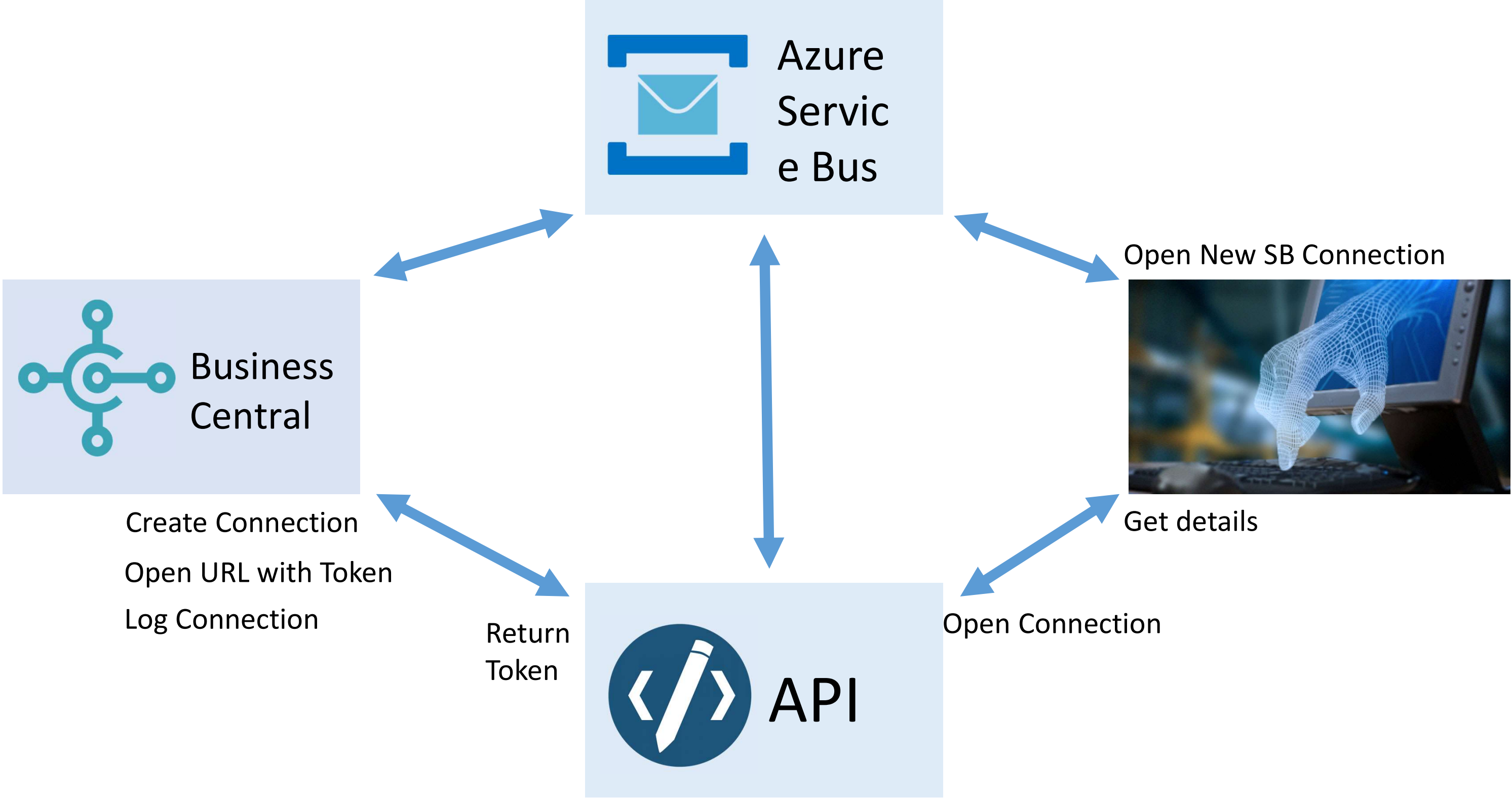
Namespace: waldo-sbr

Queue URL: <https://waldo-sbr.servicebus.windows.net/>

Active message count	1 MESSAGES	Max size	1 GB
Scheduled message count	0 MESSAGES	CURRENT	0.6 KB
Dead-letter message count	0 MESSAGES		
Transfer message count	0 MESSAGES		
Transfer dead-letter message count	0 MESSAGES		

100% FREE SPACE

Remote Connection



Remote Connection

```
begin
  SBRConnection.TestField("Agent UID");

  SBRConfiguration.FindFirst();

  SBRAgent.Get(SBRConnection."Agent UID");

  jsonContent.Add('AgentUID', SBRConnection."Agent UID");
  jsonContent.Add('TargetHost', SBRConnection."Target Host");
  jsonContent.Add('TargetPort', SBRConnection."Target Port");
  jsonContent.Add('FrontEndUser', SBRConnection."User Created");
  jsonContent.Add('Remark', SBRConnection.Remark);
  if (not IsNullGuid(SBRConnection."SBR Credential UID")) then
    jsonContent.Add('CredentialUID', SBRConnection."SBR Credential UID");
  jsonContent.WriteTo(jsonText);

  jsonResult := SBRRestApi.InvokeAPICall('Post', '/api/SBRConnections', jsonText, statusCode);
  clear(jsonContent);
  jsonContent.ReadFrom(jsonResult);
  paramParser.SetObject(jsonContent);

  resultUrl := SBRConfiguration.GetApiUrl('/api/SBRConnections/ConnectionInfo').Replace('https://', 'sbrsp://').Replace('http://', 'sbrsp://');
  resultUrl += '?token=' + paramParser.AsValue('ConnectionToken').AsText();
  resultUrl += '&stats=/api/SBRConnections/ConnectionStats';

  SBRConnection."API Connection UID" := paramParser.AsValue('ConnectionUID').AsText();
  SBRConnection.Modify();
  Commit();

  Hyperlink(resultUrl);
end;
```

Remote Connection

POST

/api/SBRConnections

```
jsonResult := SBRRestApi.InvokeAPICall('Post', '/api/SBRConnections', jsonText, statusCode);
```

Response Class (Status 200)

OK

Model

Example Value

```
{
  "ConnectionUID": "00000000-0000-0000-0000-000000000000",
  "ConnectionToken": "string"
}
```

```
SBRConnection."API Connection UID" := paramParser.AsValue('ConnectionUID').AsText();
```

Response Content Type

application/json

Parameters

Parameter	Value	Description	Parameter Type	Data Type
SBRConnectionRequest	(required)		body	<div><div>Model</div><div>Example Value</div></div> <pre>{ "AgentUID": "00000000-0000-0000-0000-000000000000" "TargetHost": "string", "TargetPort": 0, "FrontEndUser": "string", "Remark": "string", "LocalNetworkSession": true, "CredentialUID": "00000000-0000-0000-0000-000000000000" }</pre>

```
jsonContent.Add('AgentUID', SBRConnection."Agent UID");
jsonContent.Add('TargetHost', SBRConnection."Target Host");
jsonContent.Add('TargetPort', SBRConnection."Target Port");
jsonContent.Add('FrontEndUser', SBRConnection."User Created");
jsonContent.Add('Remark', SBRConnection.Remark);
if (not IsNullGuid(SBRConnection."SBR Credential UID")) then
  jsonContent.Add('CredentialUID', SBRConnection."SBR Credential UID");
jsonContent.WriteTo(jsonText);
```

Try it out!

feedback

- Receive from SBMQ

```
1 reference
local procedure ReceiveMessageREST(var SBMQQueue: Record "SBMQ Queue"): Integer
var
    SBMQRESTAPI: Codeunit "SBMQ REST API";
    BrokerProperties: Text;
    MessageBody: Text;
    StatusCode: Integer;
begin
    SBMQRESTAPI.InvokeRestMethod(SBMQQueue.GetQueueRESTUrl() + '/messages/head', 'POST', SBMQQueue.GetSASToken());
    BrokerProperties := SBMQRESTAPI.GetResponseHeader('BrokerProperties');
    MessageBody := SBMQRESTAPI.GetResponseContent();
    StatusCode := SBMQRESTAPI.GetResponseStatusCode();

    if (StatusCode = 204) then
        exit(StatusCode);

    SaveMessage(SBMQQueue, BrokerProperties, MessageBody);
end;
```

Azure

Story of 2011

Can I do something with Azure?

Virtual Machines

Azure Active
Directory

Azure SQL
Database

Virtual Machines

Apache Spark for Azure HDInsight	Apache Storm for HDInsight	API Apps	API Management	App Service	Application Gateway	Archive Storage	Automation	Avere vFXT for Azure	Azure Active Directory	Azure Active Directory B2C	Azure Active Directory Domain Services	Azure Advanced Threat Protection	Azure Advisor
Azure Analysis Services	Azure Artifacts	Azure Backup	Azure Batch AI	Azure Blueprints	Azure Boards	Azure Bot Service	Azure Cache for Redis	Azure Cosmos DB	Azure CycleCloud	Azure Data Explorer	Azure Data Lake Storage	Azure Database for MariaDB	Azure Database for MySQL
Azure Database for PostgreSQL	Azure Database Migration Service	Azure Databricks	Azure DDoS Protection	Azure DevOps	Azure DevTest Labs	Azure Digital Twins	Azure DNS	Azure Firewall	Azure Front Door Service	Azure Information Protection	Azure Kubernetes Service (AKS)	Azure Lab Services	Azure Managed Applications
Azure Maps	Azure Media Player	Azure Migrate	Azure Mobile App	Azure Monitor	Azure NetApp Files	Azure Pipelines	Azure Policy	Azure Repos	Azure Resource Manager	Azure Search	Azure Service Health	Azure SignalR Service	Azure Site Recovery
Azure Sphere	Azure SQL Database	Azure Test Plans	Batch	Bing Autosuggest	Bing Custom Search	Bing Entity Search	Bing Image Search	Bing News Search	Bing Speech	Bing Spell Check	Bing Video Search	Bing Visual Search	Bing Web Search
Blob Storage	CLIs	Cloud Services	Cloud Shell	Cognitive Services	Computer Vision	Container Instances	Container Registry	Content Delivery Network	Content Moderator	Content Protection	Cost Management	Custom Speech	Custom Vision
Data Box	Data Catalog	Data Factory	Data Lake Analytics	Data Science Virtual Machines	Developer tool integrations	DevOps tool integrations	Disk Storage	Emotion	Encoding	Event Grid	Event Hubs	ExpressRoute	Face
File Storage	Functions	HDInsight	IoT Central	IoT Edge	IoT Hub	IoT solution accelerators	Key Vault	Language Understanding	Linguistic Analysis	Linux Virtual Machines	Live and On-Demand Streaming	Load Balancer	Logic Apps
Machine Learning service	Machine Learning Studio	Managed Disks	Media Analytics	Media Services	Microsoft Azure portal	Microsoft Genomics	Mobile Apps	Network Watcher	Notification Hubs	Power BI Embedded	QnA Maker	Queue Storage	R Server for HDInsight
SAP HANA on Azure Large Instances	Scheduler	SDKs	Security Center	Service Bus	Service Fabric	Speaker Recognition	Speech to Text	Speech Translation	SQL Data Warehouse	SQL Server on Virtual Machines	SQL Server Stretch Database	Storage	Storage Explorer
StorSimple	Stream Analytics	Table Storage	Text Analytics	Text to Speech	Time Series Insights	Traffic Manager	Translator Text	Video Indexer	Virtual Machine Scale Sets	Virtual Machines	Virtual Network	Virtual WAN	Visual Studio
				Visual Studio App Center	Visual Studio Code	VPN Gateway	Web App for Containers	Web Apps	Windows 10 IoT Core Services	Xamarin			

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Azure Database for PostgreSQL	Azure Database Migration Service	Azure Databricks	Azure DDoS Protection	Azure DevOps	Azure DevTest Labs	Azure Digital Twins	Azure DNS	Azure Firewall	Azure Front Door Service	Azure Information Protection	Azure Kubernetes Service (AKS)	Azure Lab Services	Azure Managed Applications
Azure Maps	Azure Media Player	Azure Migrate	Azure Mobile App	Azure Monitor	Azure NetApp Files	Azure Pipelines	Azure Policy	Azure Repos	Azure Resource Manager	Azure Search	Azure Service Health	Azure SignalR Service	Azure Site Recovery
Azure Sphere	Azure SQL Database	Azure Test Plans	Batch	Bing Autosuggest	Bing Custom Search	Bing Entity Search	Bing Image Search	Bing News Search	Bing Speech	Bing Spell Check	Bing Video Search	Bing Visual Search	Bing Web Search
Blob Storage	CLIs	Cloud Services	Cloud Shell	Cognitive Services	Computer Vision	Container Instances	Container Registry	Content Delivery Network	Content Moderator	Content Protection	Cost Management	Custom Speech	Custom Vision
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Story of 2011

Can I do something with Azure?

Story of 2018

Can I do anything without Azure?

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Machine
Learning service

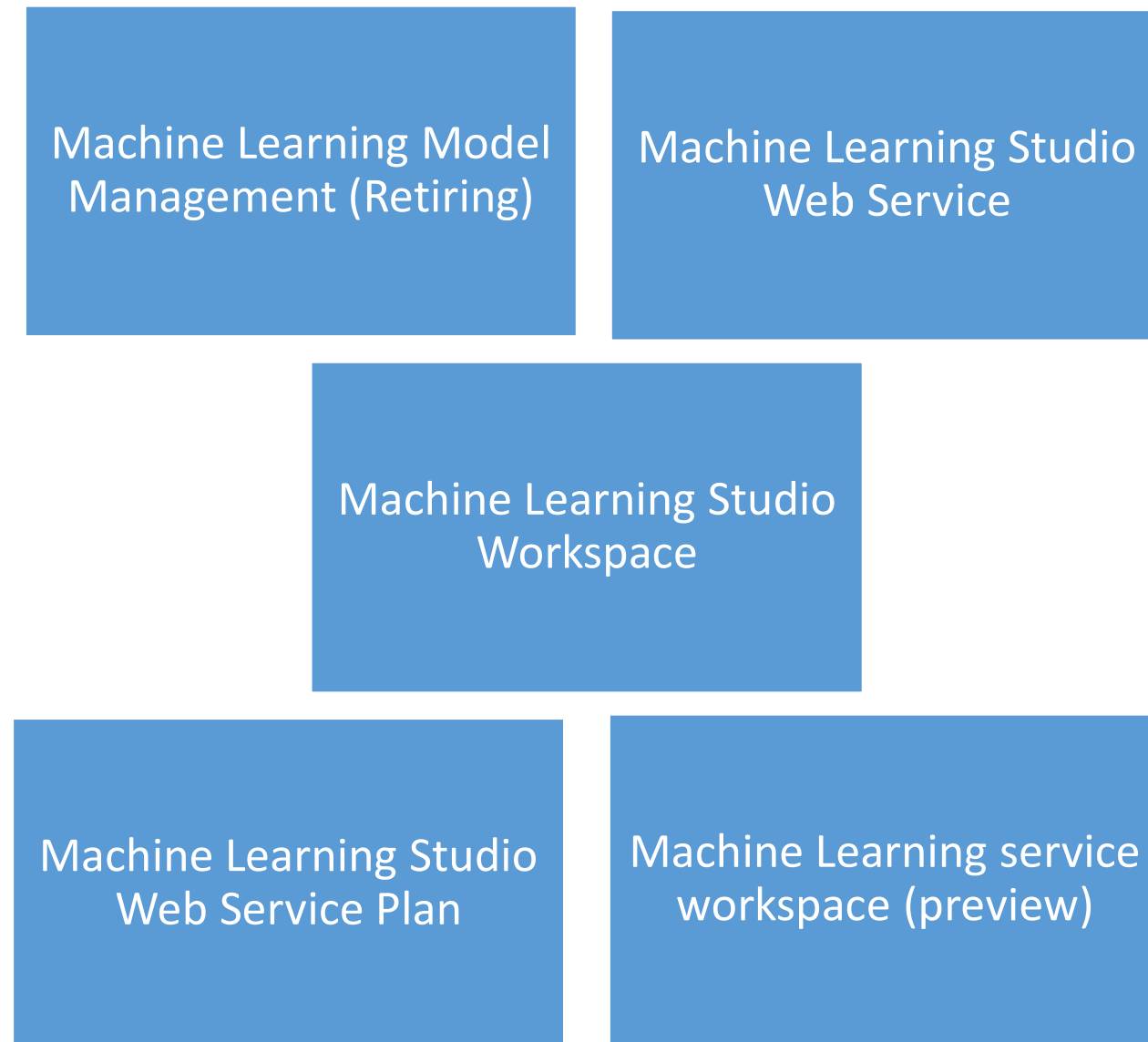
Functions

DevOps tool
integrations

Machine Learning

Bing Autosuggest v7	Bing Custom Search	Bing Entity Search	Bing Search v7	Bing Spell Check v7
Computer Vision	Content Moderator	Custom Vision (preview)	Face	Speaker Recognition (preview)
Speech	Language Understanding	QnA Maker	Text Analytics	Translator Text
Machine Learning service workspace (preview)	Machine Learning Model Management (Retiring)	Data Science Virtual Machine - Windows 2016	Machine Learning Studio Workspace	Machine Learning Studio Web Service
Machine Learning Studio Web Service Plan	Data Science Virtual Machine for Linux (Ubuntu)	Geo AI Data Science VM with ArcGIS	Deep Learning Virtual Machine	Web App Bot
	Bot Channels Registration	Functions Bot		

Machine Learning



Add some magic to Business Central with Machine Learning

ROOM 5 | SESSION | LEVEL: 200 - INTERMEDIATE

For a decades programmers used algorithms to solve specific problems. But did you know that 'if-else' is not the only way to write code? Did you know that your data can be an algorithm itself!

Yes - true.

All we need is to use data in a smart way. And that's where Machine Learning can help.

In this session we will see

- what general problems could be solved through machine learning?
- what is machine learning itself?
- how can YOU solve your customer problems with machine learning?

At the end we will see how using Dynamics 365 Business Central and machine learning in pairs, you can quickly solve problems that were previously very difficult to solve or not solved at all.

Detailed agenda:

- Understanding customer request
- Data search and preprocessing
- Azure Machine Learning Studio
- Choosing right algorithm
- Publishing and AML web services
- Presenting predictions on Power BI reports
- Prediction from Dynamics 365 Business Central



You will leave the session with the realization of a completely new approach to solving problems and understanding the tools and techniques for applying this approach in real life.

Dmitry Katson

RUSSIAN FEDERATION

AirApps



Steven Renders

BELGIUM

think about IT



Machine Learning

Computer Vision



Some ideas around Azure and NAV

- Parallel session with ours:

Crazy mix of integrations: Dynamics 365 Business Central and Microsoft azure services, Thursday 16:00-17:30



Azure DevOps & CI/CD

Who is source-controlling their
C/AL customers?



Who is not source-controlling their
C/AL customers?



Why not ??



Continuous Integration
Continuous Delivery

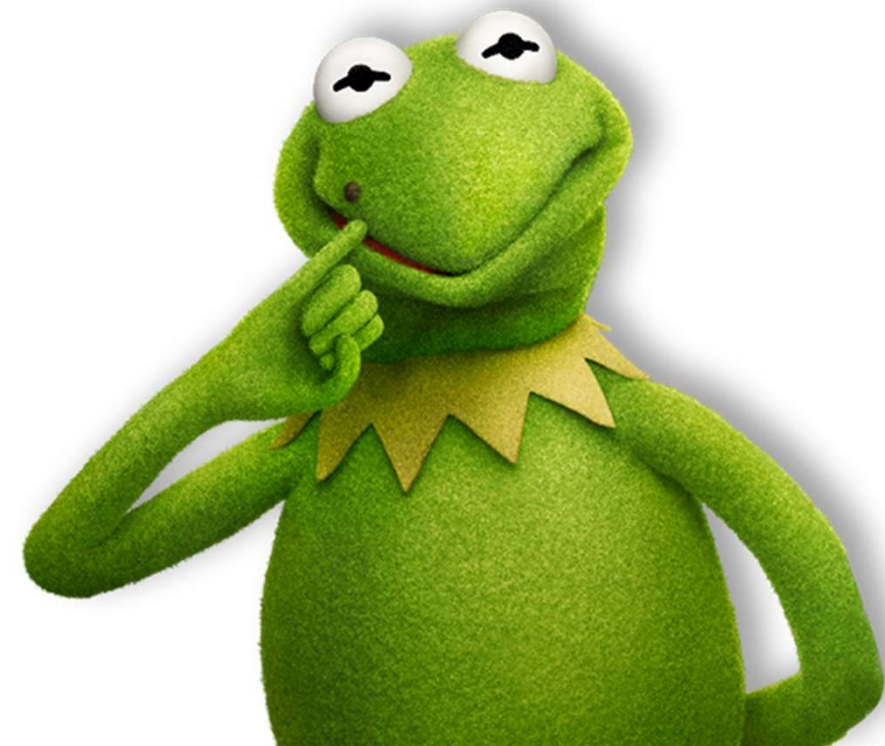
What is CI/CD

(CI) Continuous Integration

the practice of merging all developer working copies to a shared mainline several times a day

(CD) Continuous Delivery

teams produce software in short cycles, ensuring that the software can be reliably released at any time and, when releasing the software, doing so manually.



So basically, we are talking about ...

“Source control on steroids”

- Working in team
- Merging each others code to one master branch
- Testing if the branch(es) still work(s)
 - Compile the merged code
 - Apply source code analysis
 - Run Testability
 - Against multiple versions
- Release to QA
- Release to LIVE



Challenges

AppSource

Build your code againsts
all localizations

Dependencies

Update main app
means recompiling
all dependent apps

Automated Tests

During all builds, all
tests must succeed

Test environment

Release pipelines for
releasing to test/
LIVE environments

...

Good news!



VSCode comes natively with Git support

Azure DevOps helps you setting up CI/CD

Freddy is helping you with the plumbing:

- <https://blogs.msdn.microsoft.com/freddyk/tag/continuous-integration/>
- <https://blogs.msdn.microsoft.com/freddyk/tag/continuous-delivery/>



Tomorrow, at 11am!

Gunnar Gestsson

ICELAND

Advania



Kamil Sáček

CZECH REPUBLIC

Navertica



Arend-Jan
Kauffmann

NETHERLANDS

Cloud Ready Software



Tomorrow, at 11am!

CI/CD for Business Central

ROOM 5

SESSION

LEVEL: 300 - ADVANCED

It all starts with a change requirement. And another one, followed by yet another one. And please, make it quick... Eventually this results in a new version of your product running for many end users. How do you make sure you can deliver quickly and keeping up the quality of the product at the same time? That's what Continuous Integration and Continuous Delivery is about. We will discuss what CI/CD means and show real life implementations how to achieve this with Business Central.

Gunnar Gestsson

ICELAND

Advania



Kamil Sáček

CZECH REPUBLIC

Navertica



Arend-Jan
Kauffmann

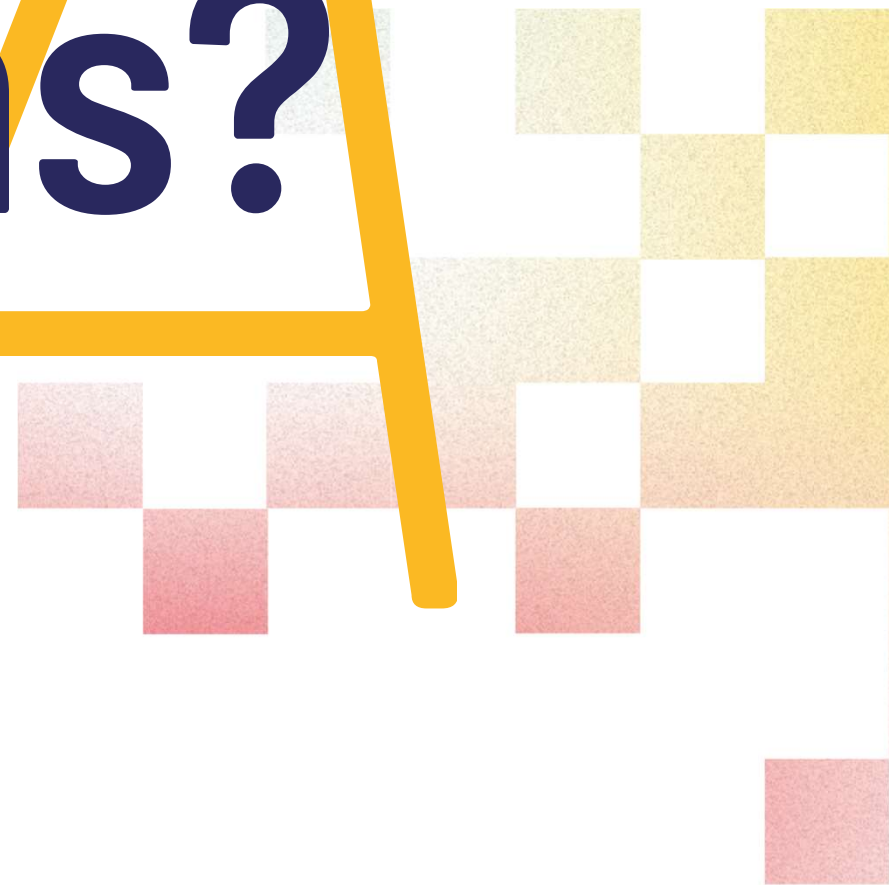
NETHERLANDS

Cloud Ready Software





Any Questions?



Thank
THANK YOU
you