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GET SOME SMARTNESS INTO DYNAMICS NAV / 365 WITH NOTIFICATIONS AND CORTANA INTELLIGENCE

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WHEN YOU ARE PASSIONATE ABOUT MICROSOFT DYNAMICS NAV | www.navtechdays.com



Objectives

Introduce the proactive interaction approach introduced in NAV 2017

Present notifications and the Notifications API of NAV 2017

Introduce Cortana Intelligence features and the Time Series API of NAV 2017

Show how Cortana Intelligence can be used from NAV 2017

A smarter NAV

Traditionally, Dynamics NAV (and ERP in general) systems react to (user) input only

What if Dynamics NAV would proactively notify users in the right context with the right information?

- For example, suggest users to migrate data if they are met with an empty company?
- For example, suggest users to stock up on items going out of inventory when creating purchase invoices?

We are building such smartness into Dynamics NAV by

- Providing a notification framework and API for notifying users in the context of their work
- Providing deep integration of Cortana Intelligence

And you can extend this...

Notifications in Dynamics NAV



HOME ACTIONS

View

Edit

New

Delete

Manage

Post

Post and Send...

Posting

Customer

Dimensions

Invoice

Reopen

Release

Approvals

Send Approval Request

Cancel Approval Request

Request Approval

OneNote

Show Attached

Refresh

Clear Filter

Page

Go to

Previous

Next

S-INV102005 · British Broadcasting Corporation

General

Customer: British Broadcasting Corporation

Contact:

Microsoft Dynamics NAV

Hold on, hold on... I know you are busy trying to fill out this invoice, but I just have to annoy you with this question right here, right now. Do you mind?

Yes No

Lines

Line New Find Filter Clear Filter

Item	Description	Quantity	Unit of Measur...	Unit Price Excl. Tax	Tax Group Code	Line Discount %	Line Amount Excl. Tax	Amount Including Tax
1001	Broadcasting stuff	10	PCS	*	*			0,00

Show more fields

Subtotal Excl. Tax (USD): 0,00

Inv. Discount Amount Excl. Tax (USD): 0,00

Inv. Discount %: 0

Total Excl. Tax (USD): 0,00

Total Tax (USD): 0,00

Total Incl. Tax (USD): 0,00

OK



Help! I stuck!

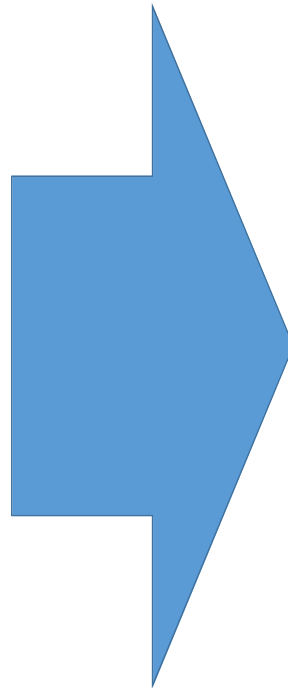
Primary motivation behind notifications



Interrupting



Telling



Suggesting



Helping Hand

Notifications for Dynamics NAV

1



There's a new tool in your toolbox
(Demo)

2



How do they work? And when should they be
used?

3



Walkthrough of the Notifications API

4



How to create a notification
(Demo)

5



How to let the user disable your notification
(Demo)

There's a new tool in your toolbox

Demo

There's a new tool in your toolbox

Demo take away:

A notification is **subtle** and **unobtrusive**. It never gets in your way, while you're in your zone. It merely **suggests a course of action**.

When should they be used?

DO use them, when you want to:

- Suggest a course of action, related to the context the user is in
- Provide some additional contextual information
- Assist the user in using the product

DO NOT use them, when you want to:

- Make sure the user takes action
- Make sure the user is made aware of a certain condition
- Provide information which is unrelated to current context

They work everywhere

VIEW - CUSTOMER CARD

01454545 · New Concepts Fur...

✕

Approval required for: 01454545; Credit Limit (\$) was chaged from 1000 to 5000 by Andrei

Approve

Reject

Delegate

Balance (\$)

0.00

Balance Due (\$)

0.00

Credit Limit (\$)

0.00

Blocked

☐

Total Sales

0.00

Costs (\$)

0.00

Address & Contact

Office 365

Outlook

Search Mail and People

New

Delete

Archive

Junk

Sweep

Move to

Categories

Undo

Folders

More

Groups

Contoso News

Core Team

Software Develop

Operations and Fi

Marketing Team

Marketing Campa

Marketing - Profe

IT - Professional C

Industry Trends

Executive Corner

More

Inbox

All

Miriam Graham

Office Chairs

Hi Alex, I received the last batch of chairs and expect...

Mike Borg Cardona

1 new invoice from "American Woods" for yo

Thanks, Mike Borg Cardona -- Mike Borg Cardona ...

Two weeks ago

MOD Administrator

MOD Administrator added you to the Oper...

Welcome to the Operations and Facilities group. ...

9/15/2016

MOD Administrator

MOD Administrator added you to the Marki...

Welcome to the Marketing Team group. Marketin...

9/15/2016

MOD Administrator

MOD Administrator added you to the Marki...

Welcome to the Marketing Campaigns group. Ma...

9/15/2016

MOD Administrator

MOD Administrator added you to the Marki...

Welcome to the Marketing - Professional Developme...

9/15/2016

MOD Administrator

Miriam Graham

Today, 7:21 AM

Alex Wilber

Reply all

Undo

Dynamics NAV

Delve Analytics

1013 · TraxTonic Sdn Bhd

Edit

Pop Out

Refresh

...

✕

The customer's credit limit has been exceeded.

Details...

General

Show more

Customer

TraxTonic Sdn Bhd

Contact

Miriam Graham

Posting Date

1/25/2018

Due Date

1/31/2018

Lines

Hi Alex,

I received the last batch of chairs and expect to be invoiced for the last 2 fluffy green ones. I like discounts.

thanks,

ITEM LIST

Items

+ new

...

✕

Would you like to get the sales forecast updated automatically every week?

Yes, please

No, thanks

1939-S

BERLIN Guest Chair, yellow

136

PCS

192.80

1932-W

OSLO Storage Unit/Shell

15

PCS

244.30

1980-S

ROME Guest Chair, green

178

PCS

192.80

1964-L

TOKYO Guest Chair, blue

113

PCS

192.80

Microsoft Dynamics NAV

1013 · TraxTonic Sdn Bhd

Customer

TraxTonic Sdn Bhd

Contact

Miriam Graham

Posting Date

1/25/2018

Due Date

1/31/2018

How do they work?

Microsoft Dynamics NAV

EDIT - PURCHASE INVOICE - 1001 - AMERICAN WOOD EXPORTS

You will never guess where this notification came from :)

1001 · American Wood Exports

General

Vendor: American Wood Exports
Contact: Mr. Jeff D. Henshaw
Posting Date: 1/25/2018
Due Date: 1/31/2018
Vendor Invoice No.: 11-51

Lines

Item	Description/Comment	Quantity	Unit of Measure Code	Direct Unit Cost Excl. Tax	Tax Group Code	Line Amount Excl. Tax	Line Discount %
1120	Spokes	1	PCS	2.00		2.00	
1110	Rim	12	PCS	1.05		11.34	10

Subtotal Excl. Tax (USD): 13.34
Inv. Discount Amount (USD): 0.00
Invoice Discount %: 0

Total Excl. Tax (USD): 13.34
Total Tax (USD): 0.00
Total Incl. Tax (USD): 13.34

Incoming Document Files

Forecast

There is nothing to show in this view.

Not enough historical data

1

2

3

Walkthrough of the Notifications API

Function	Description
MESSAGE	Specifies the textual content of the notification that appears in the UI.
ID	ID of the notification. If assigned, a notification can be updated or recalled.
SCOPE	<i>Specifies the scope in which the notification appears (Local only).</i>
SEND	Sends the notification to be displayed by the client.
RECALL	Recalls an already sent notification with the ID property of the notification set.
ADDACTION	Adds an action on the notification.
SETDATA	Sets a data property value for the notification.
GETDATA	Gets a data property value from the notification.

Properties

Functions

How to create a notification (Demo)

Demo

Embedding notifications into "My Notifications"

What?

You might want to disable a certain notification all together.

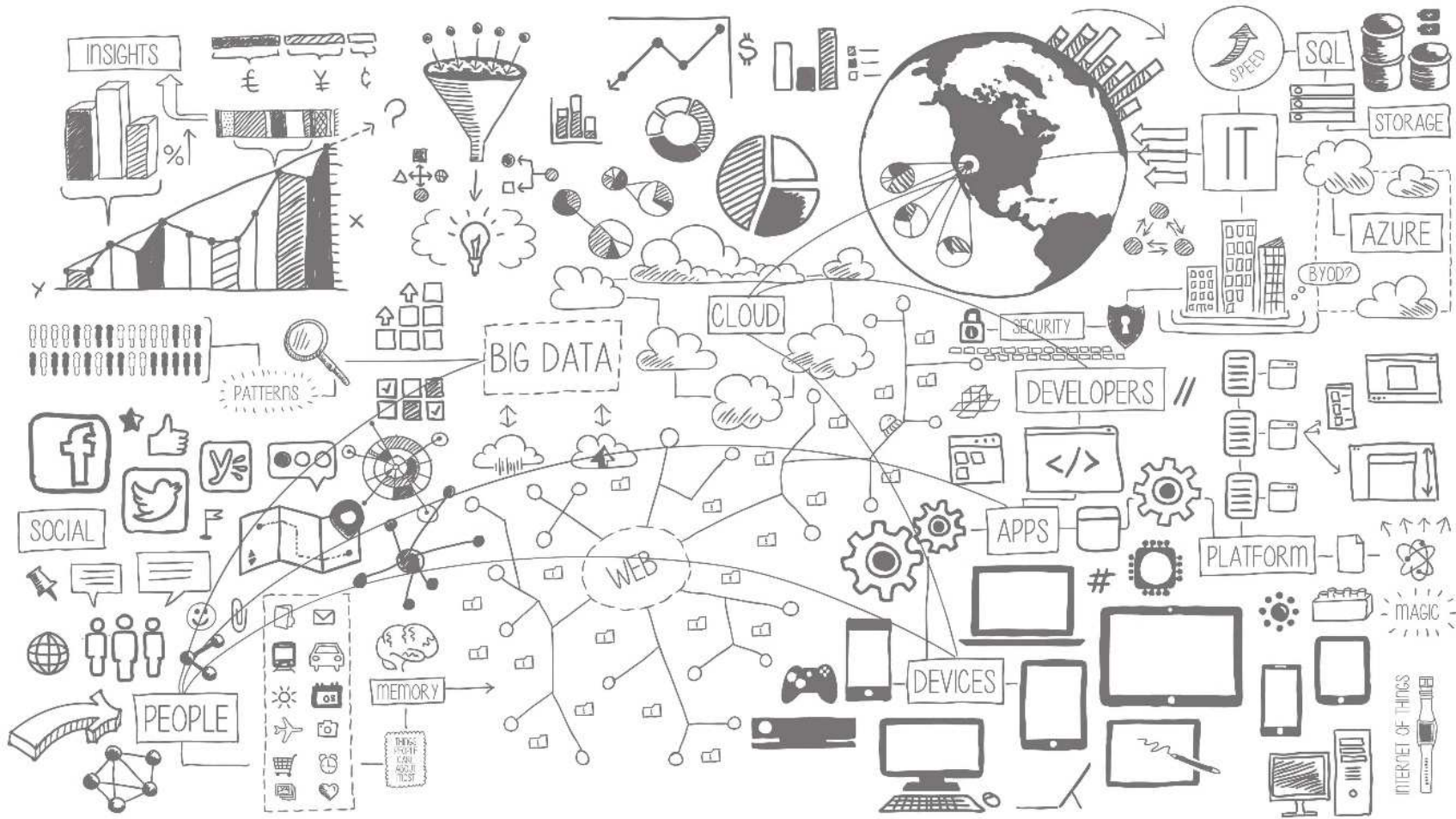
How?

- 1) By subscribing to the `OnInitializingNotificationWithDefaultState` event
- 2) By calling the `MyNotifications.InsertDefault` function
- 3) By checking the `MyNotifications.IsEnabled` function

And that's it!

**I'll be happy to answer any questions
about notifications in this session's Q&A**

Cortana Intelligence in Dynamics NAV



Cortana Intelligence in Dynamics NAV

1



What is Cortana Intelligence and Machine Learning?

2



How is Cortana Intelligence used in NAV?

3



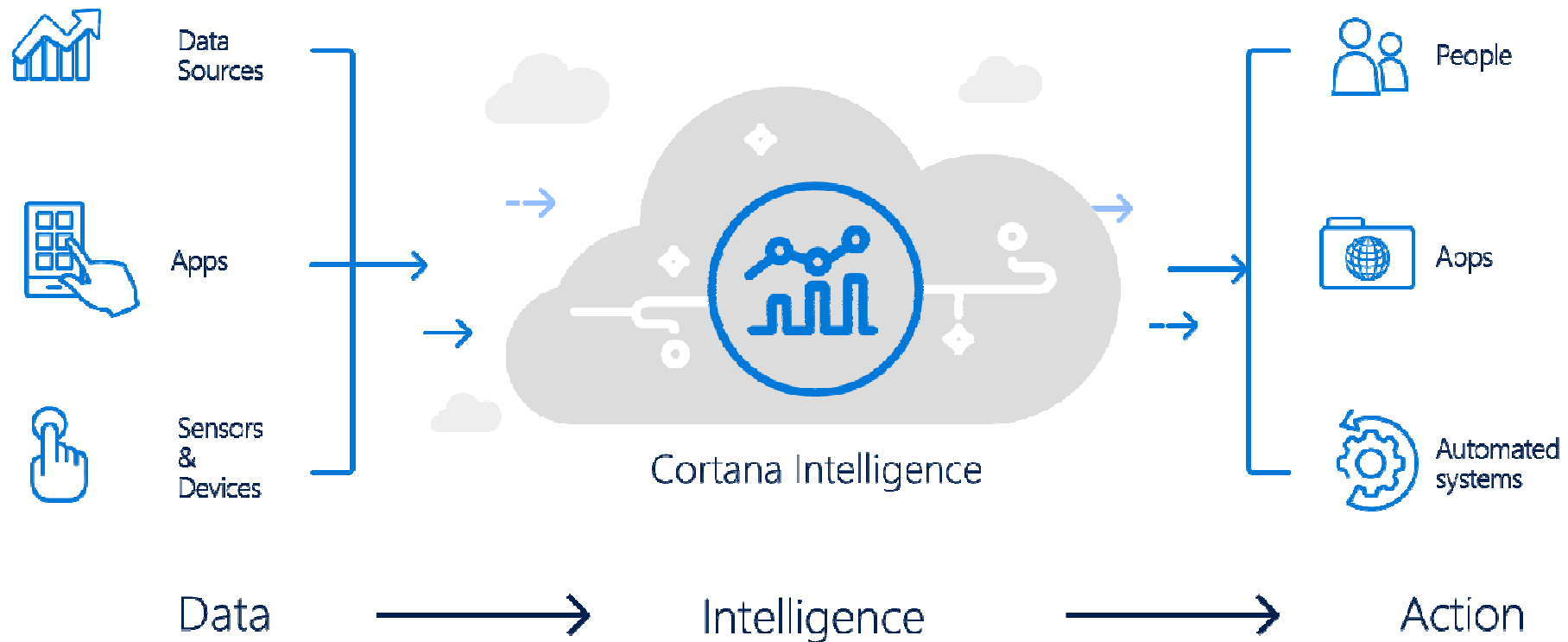
Using the Time Series API in NAV

4

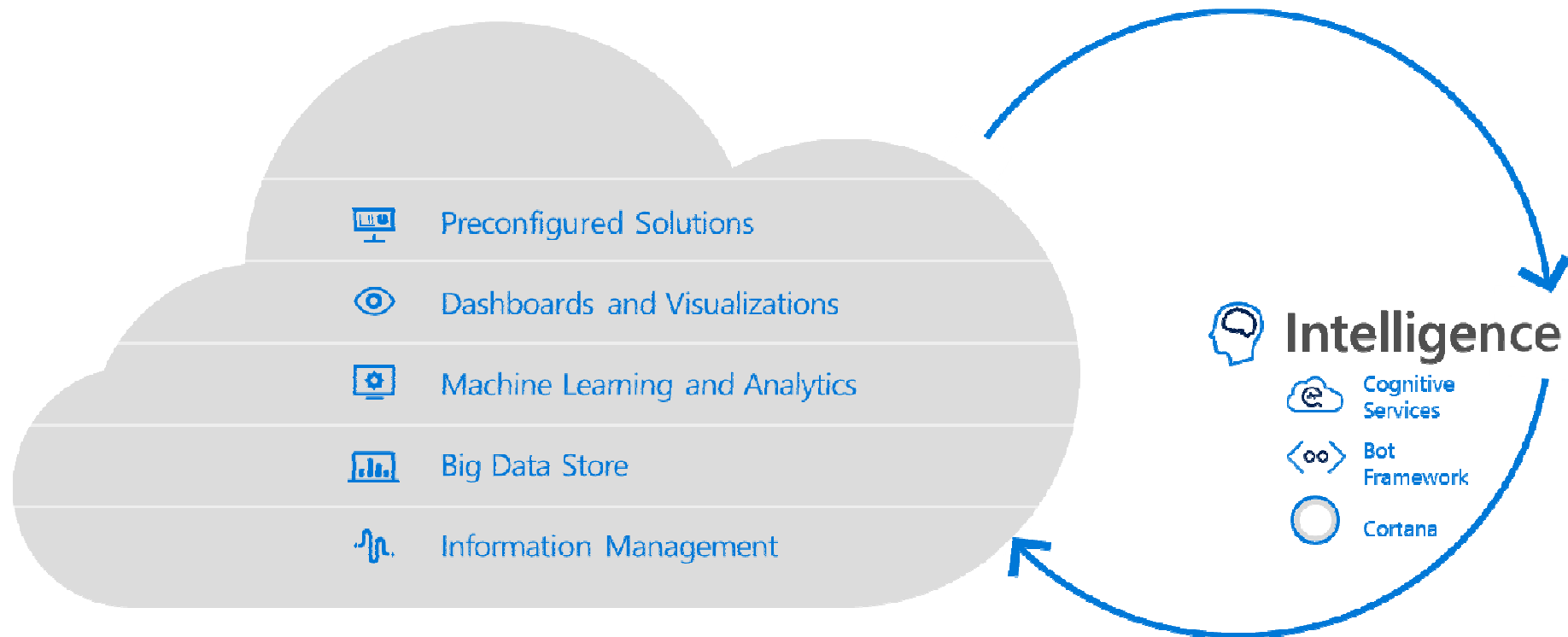


Using Azure ML from NAV

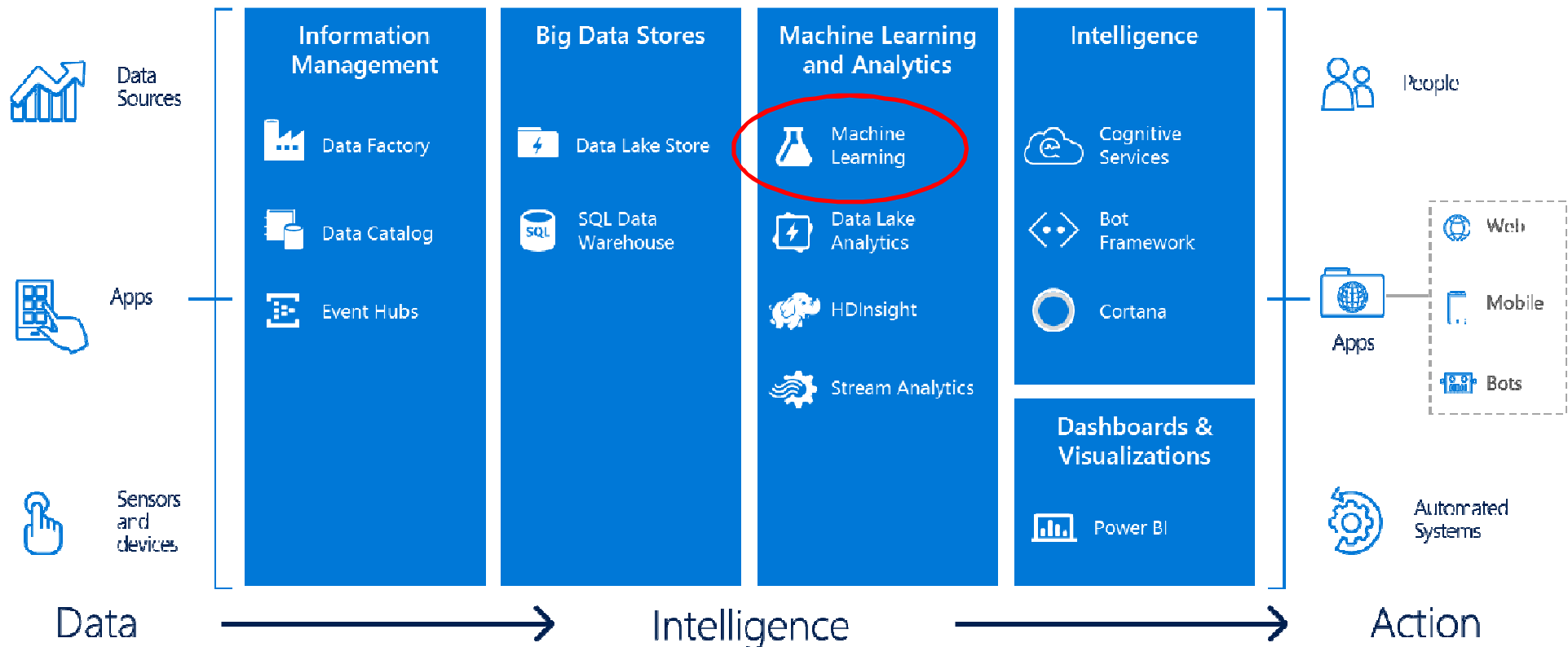
Transform data into intelligent action with Cortana Intelligence



Using exclusive, advanced intelligence technologies..



...and incorporating industry-leading Microsoft solutions



ML101 – What is Machine Learning?

A way to teach a system to make predictions for future data based on historical data

Scenario	Historical data	Prediction	Type
Will we have stock-out of an item?	Historical sales of item and similar items	Inventory level for item	Time series forecasting
Will we run out of cash?	Summarized payables and receivables history	Cash flow	Time series forecasting
Will a customer pay an invoice late?	Historical sales invoices for customers with payment date	Whether an invoice will be paid late based on properties of invoice	Classification
Which items can I sell to this customer?	Transaction history of items bought for customers	Items that the customer is likely to buy	Recommendation
Which discount rate is optimal for this sales quote?	Sales quote and invoice history	Discount rate for which customer is most likely to buy vs highest profit	Regression

NAV 2017 API

Using Azure ML integration

ML 101 – late payment prediction



It is recommended to ask for a prepayment for this invoice.

Details

Never show again



How do we create the machine learning model for such a prediction?

First, get historical/example data

- Actual, historical sales invoices
- “Features” of these e.g.
 - Amount
 - Number of sales invoice lines
 - Customer postal code
 - Average late days for customer
 - ...
- **Label**, i.e., what we want to predict
 - Was a historical sales invoice paid on time or not

Amount	Num lines	Postal code	Avg late days	Late
\$100	3	Urban	0	No
\$50	4	Suburban	2	Yes
\$59	1	Rural	4	No
...

ML 101 – late payment prediction



It is recommended to ask for a prepayment for this invoice.

Details

Never show again



Divide historical data into **training** data (e.g., 80%) and **evaluation** data (e.g., 20%)

Train a model to predict the label

Evaluate the model using the evaluation data

Using sales invoice data in NAV during sales invoice creation, **predict** the label

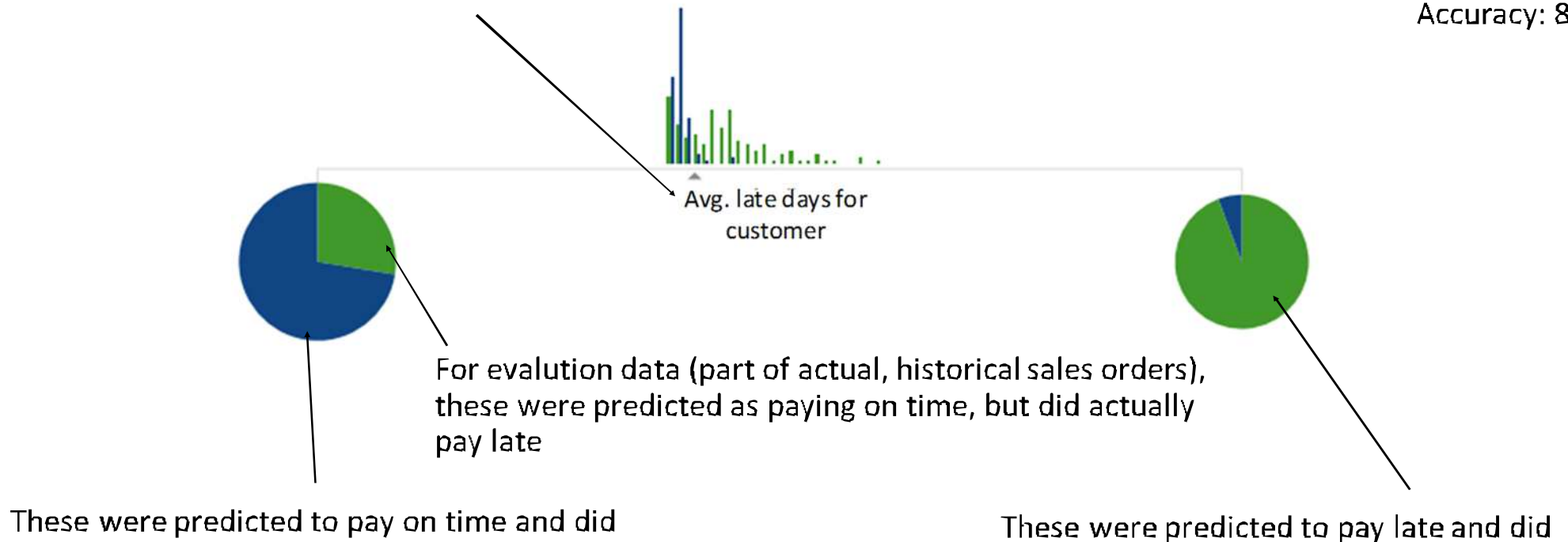
Hook into sales invoice creation using events and show a notification

Amount	Num lines	Postal code	Avg late days	Late
\$2000	12	Urban	1	?

ML 101 – training a decision tree model

In training data (part of actual, historical sales orders), this variable was seen to be best way of dividing data

Accuracy: 80%



ML101 – training a decision tree model

Accuracy: 84%



The expectation is that future data (customers with sales orders) will have similar properties

Cortana Intelligence

In NAV 2017

Integrating Cortana Intelligence

Sales and Inventory Forecast

Demo

Setting up the environment

Demo

The Time Series API

Initialize API w/
Azure ML Credentials

```
CalculateForecast(ItemNo : Code[20]) : Decimal
TimeSeriesManagement.Initialize(ApiURITxt,ApiKeyTxt,0);
```

Prepare item ledger data
for forecasting

```
ItemLedgerEntry.INIT;
ItemLedgerEntry.SETRANGE("Item No.",ItemNo);
ItemLedgerEntry.SETRANGE("Entry Type",ItemLedgerEntry."Entry Type"::Sale);
```

Forecast one month
ahead

```
TimeSeriesManagement.PrepareData(
    ItemLedgerEntry,
    ItemLedgerEntry.FIELDNO("Item No."),
    ItemLedgerEntry.FIELDNO("Posting Date"),
    ItemLedgerEntry.FIELDNO(Quantity),
    Date."Period Type"::Month,
    WORKDATE,
    12);
```

```
TimeSeriesManagement.Forecast(1);
```

Get and return forecast

```
TimeSeriesManagement.GetForecast(TempTimeSeriesForecast);
IF TempTimeSeriesForecast.FINDFIRST THEN
    EXIT(TempTimeSeriesForecast.Value);
```

Time Series API

Demo

Partner benefits

Extension ready

- Use the Time Series API to build and deliver business machine learning to customers.

Low ramp-up costs

- Save time and money. The API is based on familiar C/AL and is straightforward and cost-efficient to use. You don't need to train or re-train the model.

Widely applicable

- Use data from many parts of Microsoft Dynamics NAV as a source for time series analysis.

Compatible with other models

- Use the Time Series API with models provided by Microsoft Dynamics NAV and AX.

Cash Flow Forecast

Demo

Cortana Intelligence

In NAV 2017

Integrating Cortana Intelligence

Azure ML – Direct Marketing Prediction

Demo

Cognitive Services - Computer Vision API



Features:

Feature Name	Value
Description	{ "type": 0, "captions": [{ "text": "a black chair", "confidence": 0.43826513572991826 }] }
Tags	[{ "name": "furniture", "confidence": 0.9510501027107239 }, { "name": "seat", "confidence": 0.9450947642326355 }, { "name": "black", "confidence": 0.9312445521354675 }, { "name": "indoor", "confidence": 0.9223470687866211 }, { "name": "floor", "confidence": 0.9207894206047058 }, { "name": "chair", "confidence": 0.829627513885498 }, { "name": "feet", "confidence": 0.2150254100561142 }]



Features:

Feature Name	Value
Description	{ "type": 0, "captions": [{ "text": "a red bike", "confidence": 0.16017652238059926 }] }
Tags	[{ "name": "red", "confidence": 0.8974392414093018 }]

Face Detection API



```
"faceAttributes": {  
  "age": 42.3,  
  "gender": "male",  
  "headPose": {  
    "roll": -4.8,  
    "yaw": -0.2,  
    "pitch": 0  
  },  
  "smile": 1,  
  "facialHair": {  
    "moustache": 0,  
    "beard": 0.1,  
    "sideburns": 0  
  },  
  "glasses": "ReadingGlasses"  
}
```



```
"faceAttributes": {  
  "age": 37,  
  "gender": "female",  
  "headPose": {  
    "roll": -9.2,  
    "yaw": 3,  
    "pitch": 0  
  },  
  "smile": 0.039,  
  "facialHair": {  
    "moustache": 0,  
    "beard": 0,  
    "sideburns": 0  
  },  
  "glasses": "NoGlasses"  
}
```



```
"faceAttributes": {  
  "age": 54.4,  
  "gender": "male",  
  "headPose": {  
    "roll": 4,  
    "yaw": -0.9,  
    "pitch": 0  
  },  
  "smile": 0.973,  
  "facialHair": {  
    "moustache": 0.2,  
    "beard": 0,  
    "sideburns": 0  
  },  
  "glasses": "NoGlasses"  
}
```

Summary

The new Notification and Cortana Intelligence features add context-aware, proactive smartness to Dynamics NAV

The Notification API allows developers to build context-aware notifications using a Builder pattern

- Notifications appear in a context
- They may have actions that invoke procedures in codeunits
- Notifications may be managed, recalled etc.

The Time Series API allows developers to build proactive forecasting features

- Tables with a grouping ID, a date, and a quantity can be used as historic data for forecasting
- The Time Series API is set up using a prepackaged Cortana Intelligence template for Azure Machine Learning
 - This is set up out of the box in Dynamics 365 for Financials

Both features are available in Dynamics NAV 2017 and Dynamics 365 for Financials

- Extensions can be written on top – get in touch!

Summary



The new Notification and Cortana Intelligence features add context-aware, proactive smartness to Dynamics NAV

The Notification API allows developers to build context-aware notifications using a Builder pattern

The Time Series API allows developers to build proactive forecasting features

Both features are available in Dynamics NAV 2017 and Dynamics 365 for Financials

Questions?

Q&A