

Welcome

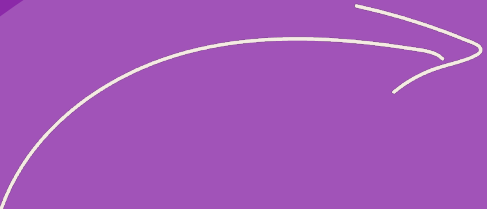


Discover 

-----> the power of 

DataMiner Object Models

YOUR HOST



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YOUR HOST



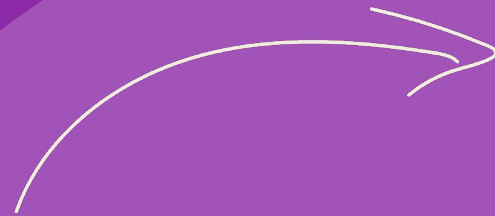
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CONSULTING SOLUTIONS ENGINEER



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Agenda

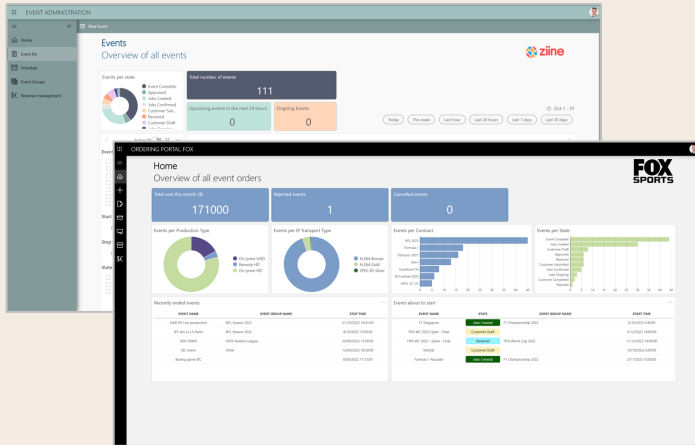


1. Introduction **15 min**
 - What is DataMiner Object Models (DOM)?
 - Options to create a model
2. Hands-on - Create a model from scratch **35 min**
3. **30 min break**
4. Status system **15 min**
 - Configuration walkthrough
5. Good to know **15 min**
 - Best practices
 - What's new since last Empower?
 - DOM in the DataMiner docs
6. Hands-on - Extend our DOM model **20min**

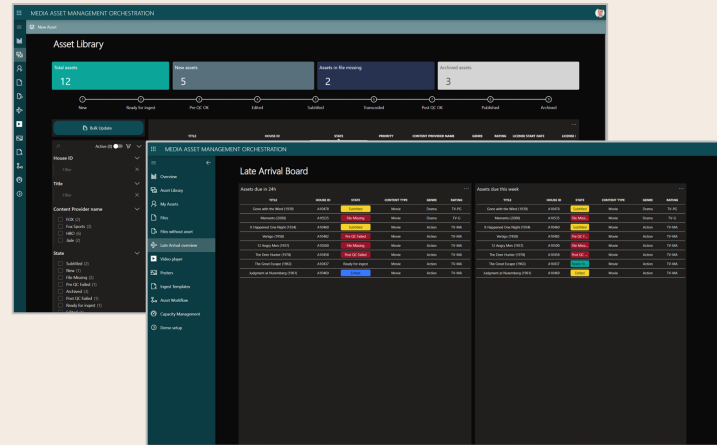


DataMiner Object Models (DOM)

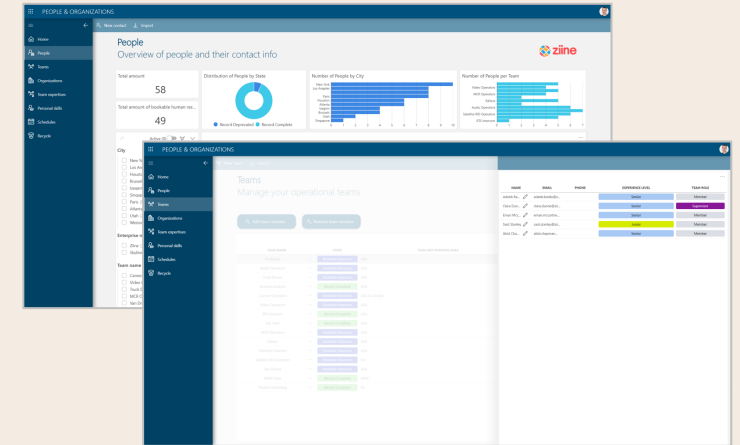
Enrich your operation with just any administrative data



- Event administration
- Event customer portals
- Vehicle resource management



- Asset management
- RPD provisioning
- Planned maintenance
- Ticketing



- People and organizations
- Human resource scheduling
- Virtual desk management



DOM - Introduction

Goal - Our model - Vehicle

License Plate ⓘ	ABC-123
Location ⓘ	USA <
Capabilities ⓘ	HD and 1 other option <
Size ⓘ	Medium <
Number Of Cameras ⓘ	12



DOM - Introduction

The 4 core DOM objects

1

Module Settings

2

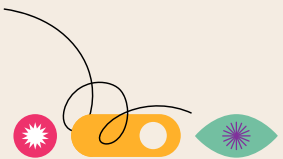
Section Definitions
(with FieldDescriptors)

3

DOM Definitions

4

DOM Instances



DOM - Introduction

The 4 core DOM objects

1

Module Settings

2

Section Definitions
(with FieldDescriptors)

3

DOM Definitions

4

DOM Instances



DOM - Introduction

1. Module Settings

- **Defines cross-model settings and forms a logical grouping of DOM models.**
- Setting types:
 - Script settings (CRUD scripts)
 - Time-to-live of data (TTL)
 - History settings
 - Storage settings
 - ...
- Advanced use, defaults are fine in most cases

Module Settings

ID:	my_vehicle_manager
ScriptSettings	...
TtlSettings	...
...	



DOM - Introduction

1. Module Settings

- Module ID:
 - Unique in the DMS
 - Between 1 and 40 characters
 - Lowercase and not contain any special characters (see [docs](#))
- Example: **my_vehicle_manager**

Module Settings

ID:	my_vehicle_manager
ScriptSettings	...
TtlSettings	...
...	



DOM - Introduction

The 4 core DOM objects

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Module Settings

2

Section Definitions
(with FieldDescriptors)

3

DOM Definitions

4


DOM Instances





DOM - Introduction


2. Section Definition


- Defines a section of your DOM model.
- A section is a group of fields that belong together.
- Fields are described by **Field Descriptors**.
- These Section Definitions can be reused between definitions.

License Plate 

Location 

Capabilities 

Size 

Number Of Cameras 

SectionDefinition

ID: a451c946...

Field Descriptors:

- ID:** 23e7a506...
Name: License Plate
Type: string
-
- ID:** 1a8ea403...
Name: Number Of Cameras
Type: long



DOM - Introduction

2. Section Definition - Field Descriptor

Basic:

- String
- Double
- Long
- DateTime
- TimeSpan
- Bool

Special:

- Auto Increment
- Enum
- SRM Booking
- SRM Resource
- SRM Service Definition
- DOM Instance
- DOM Instance Value
- DataMiner Element
- DataMiner Group
- DataMiner User

SectionDefinition

```
ID: a451c946...  
  
Field Descriptors:  
ID: 23e7a506...  
Name: License Plate  
Type: string  
...  
ID: 1a8ea403...  
Name: Number Of Cameras  
Type: long
```



DOM - Introduction

The 4 core DOM objects

1

Module Settings

2

Section Definitions
(with FieldDescriptors)

3

DOM Definitions

4

DOM Instances



DOM - Introduction

3. DOM Definition

- Defines a certain DOM model by linking together the relevant Section Definitions.
- Can also define overrides of the Module Settings if these would differ for a certain model.

SectionDefinition

ID:	a451c946...
Field Descriptors:	...



DOM Definition

ID:	eb7c180f...
Section Links:	
	ID: a451c946...



DOM - Introduction

The 4 core DOM objects

1

Module Settings

2

Section Definitions
(with FieldDescriptors)

3

DOM Definitions

4

DOM Instances

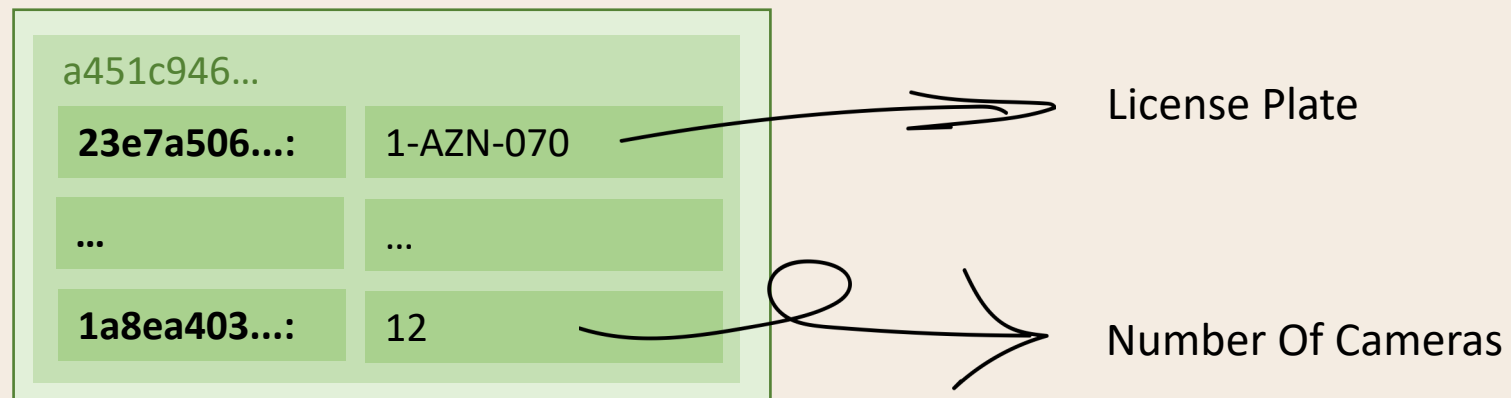


DOM - Introduction

4. DOM Instance

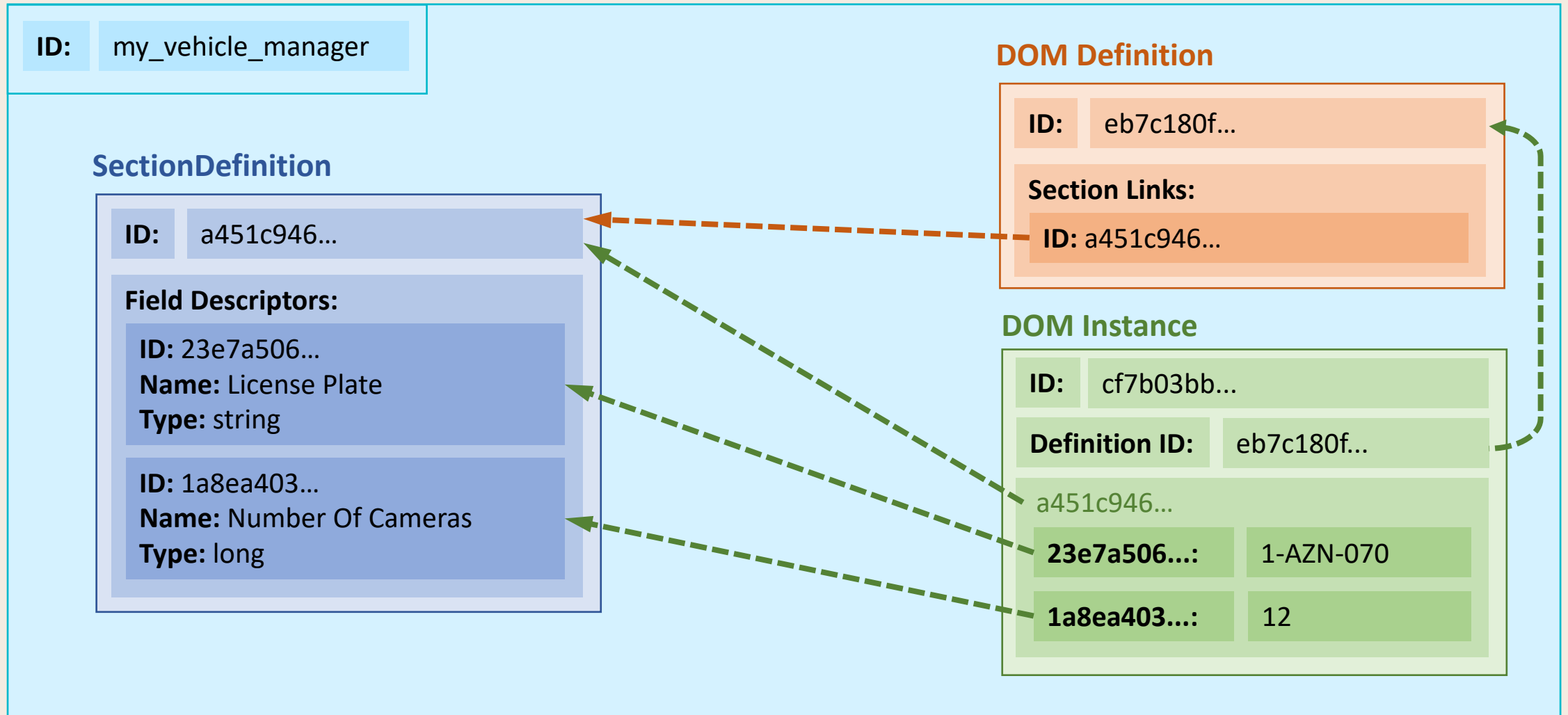
- Represents the actual objects that adhere to the DOM **model**. In our case 'Vehicles'.
- Contains a Section for each Section Definition.
- Sections contain a Field Value for each Field Descriptor.
- There could be millions of DOM instances in a DOM module.

DOM Instance



DOM - Introduction

Module Settings



Creating the model

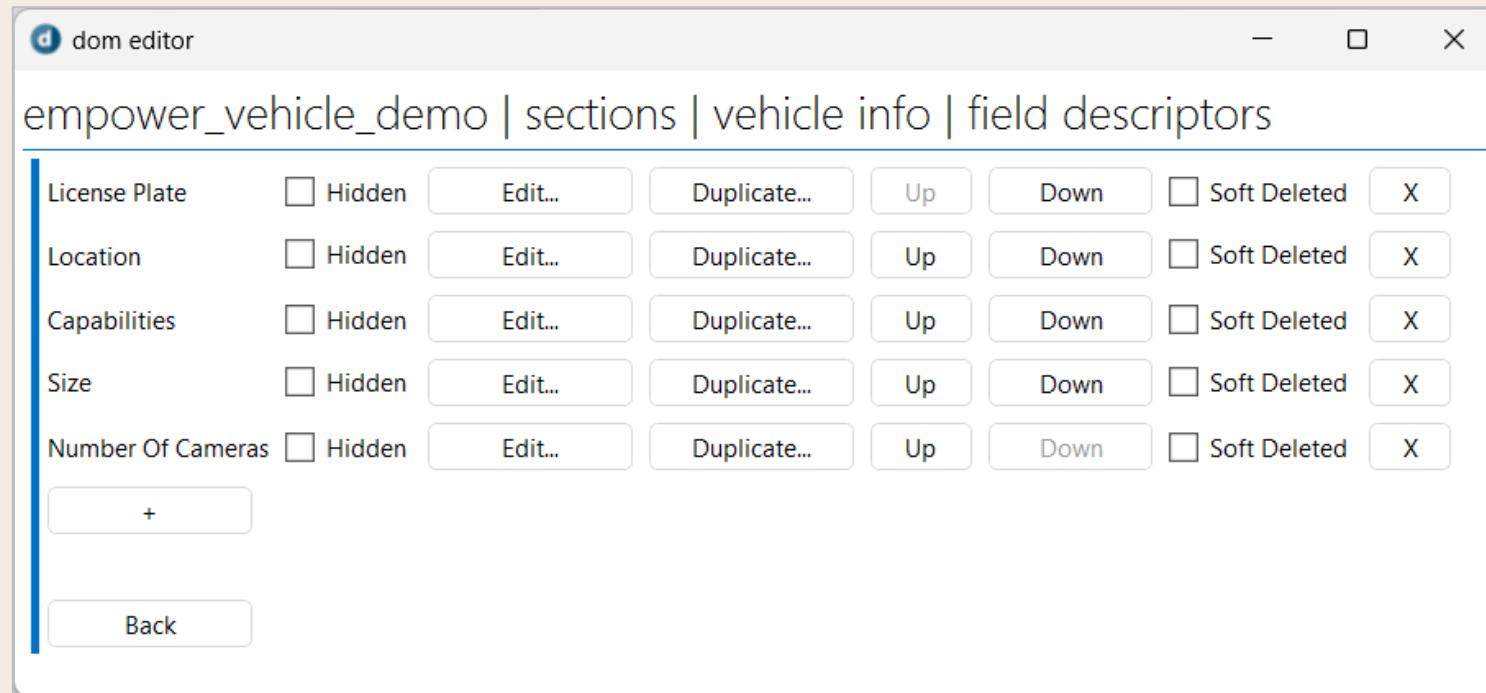
- **Option 1:** Code ←---
- **Option 2:** DOM Editor script
- **Option 3:** DOM Designer script + Excel

```
// Create DomDefinition
_domDefinition = new DomDefinition
{
    SectionDefinitionLinks = new List<SectionDefinitionLink>()
    {
        new SectionDefinitionLink(_sectionDefinition.GetID())
    }
};
_domDefinition = _domHelper.DomDefinitions.Create(_domDefinition);
```



Creating the model

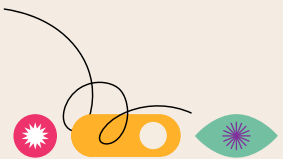
- **Option 1:** Code
- **Option 2:** DOM Editor script ←
- **Option 3:** DOM Designer script + Excel



Creating the model

- **Option 1:** Code
- **Option 2:** DOM Editor script
- **Option 3:** DOM Designer script + Excel ← - - -

	A	B	C	D	E
1	SectionName	Name	Type	Default	Values
2	Order details	Order id	String		
3	Order details	Description	String		
4	Order details	Start time	DateTime		
5	Order details	End time	DateTime		
6	Order details	Server location	Enum	Europe	Europe/US
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
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21					
22					
23					
24					
25					
26					





Hands-on

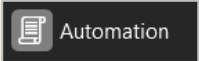


DOM - Hands-on

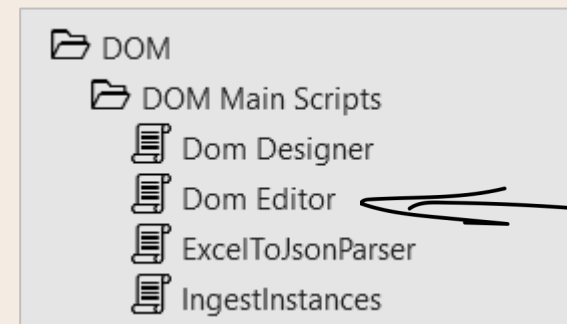
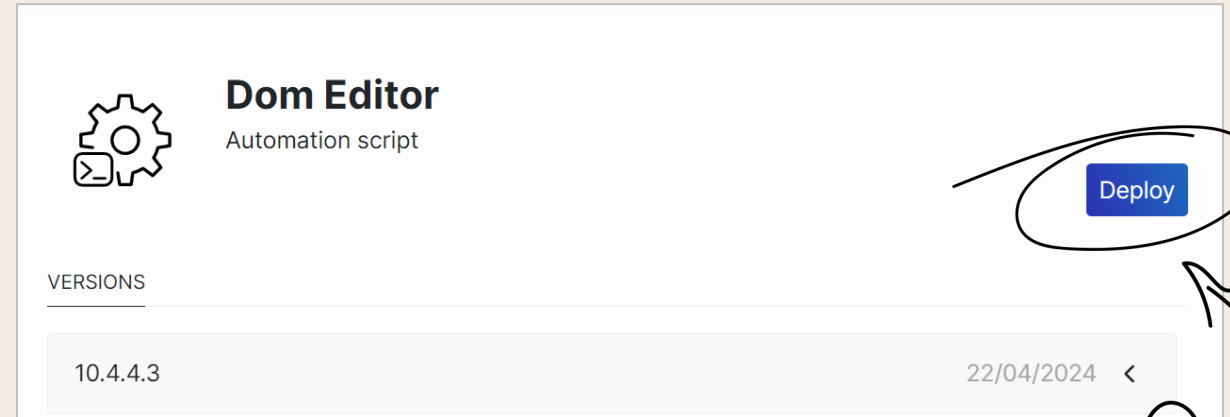
Create our DOM model using the DOM editor

1. Go to <https://catalog.dataminer.services/>
2. Search for 'Dom Editor'
3. Deploy this package to your DaaS agent

4. Open up Cube 

5. Go to the Automation module 

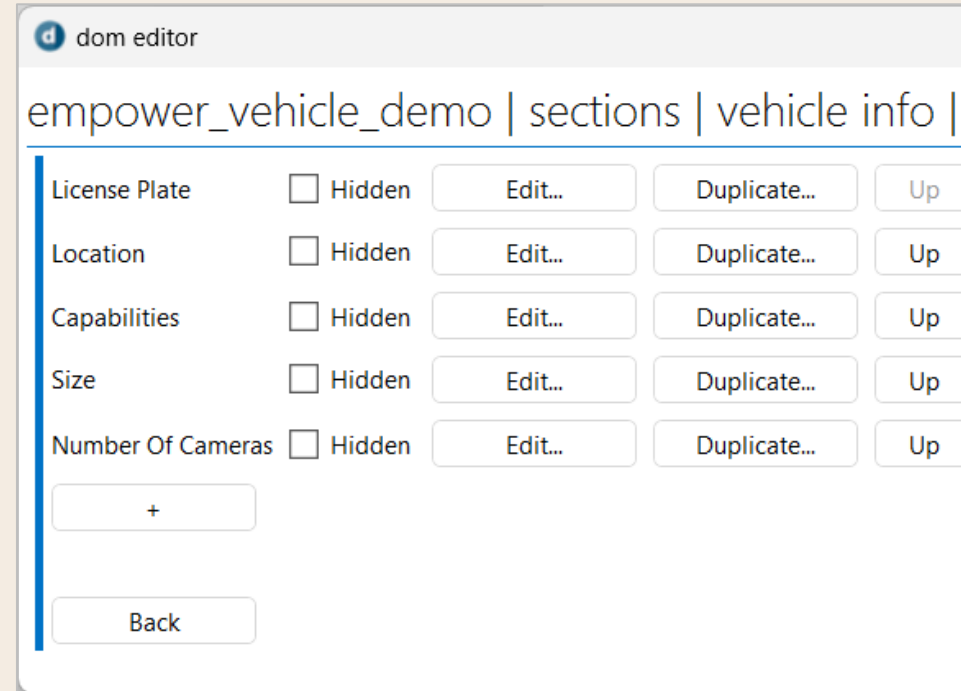
6. Execute the 'Dom Editor' script 



DOM - Hands-on

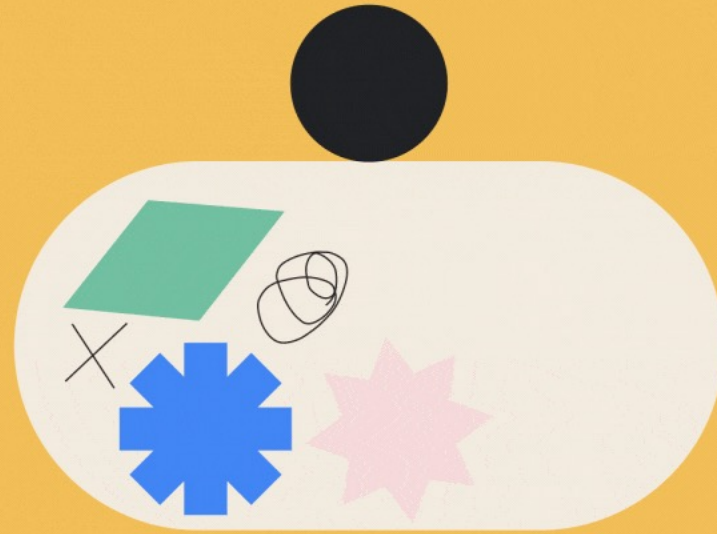
Create our DOM model using the DOM editor

- Create a DOM model for a vehicle with fields:
 - **License Plate** – Text like (e.g. '1-AZN-070')
 - **Location** – List of values (e.g. 'UK', 'Belgium', etc.)
 - **Size** – List of values (e.g. 'Small', 'Medium', 'Large', etc.)
 - **Number of Cameras** – Number (e.g. '12')

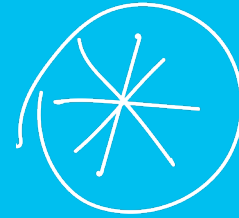


SEE YOU IN 30 MINUTES

Break



emp
wer !



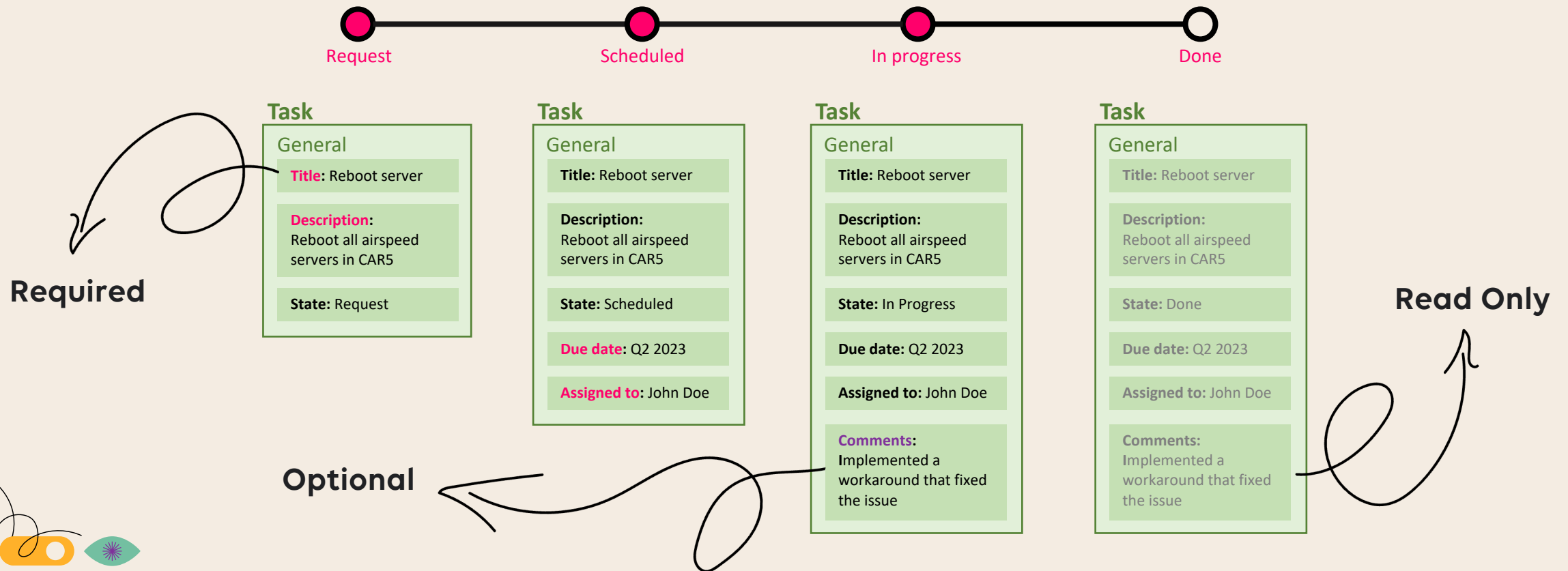
Status System



DOM - Status System

Expand your DOM model with a status system

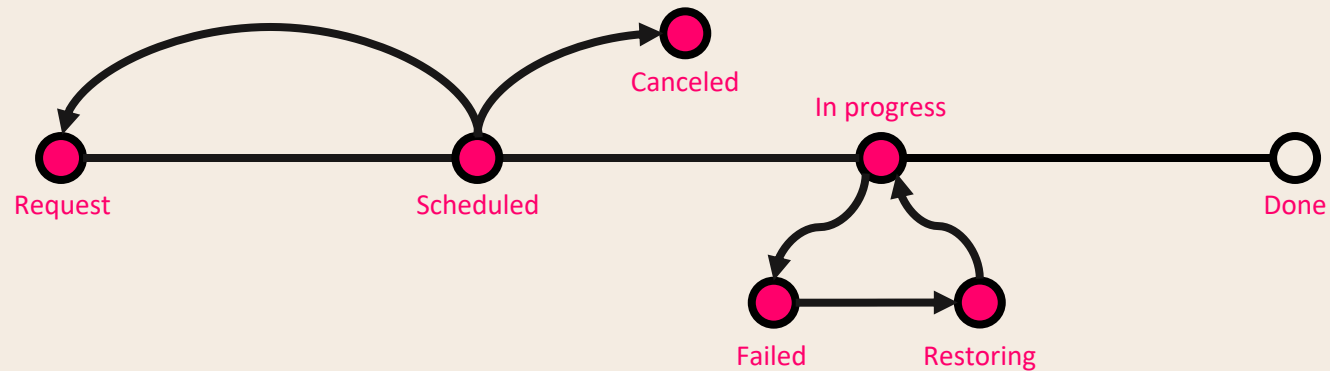
- Allows you to assign a state to a DOM instance, transition between these state and put conditions on whether fields should be required, read-only, hidden etc. for each state.



DOM - Status System

Expand your DOM model with a status system

- Allows you to assign a state to a DOM instance, transition between these state and put conditions on whether fields should be required, read-only, hidden etc. for each state.

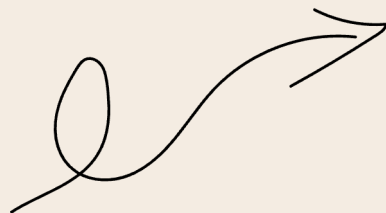


DOM - Status System

Configuring the status system

DOM Definition

Id:	60f4e812...
DomBehaviorDefinitionId:	e2bbde66...
...	...



DOM Behavior Definition

Id:	e2bbde66...
InitialStatusId:	new
Statuses:	List<DomStatus>
StatusTransitions:	List<DomTransition>
SectionDefinitionLinks:	List<...Link>



DOM - Status System

Configuring the status system

DOM Behavior Definition

Id:	e2bbde66...
InitialStatusId:	new
Statuses:	List<DomStatus>
StatusTransitions:	List<DomTransition>
SectionDefinitionLinks:	List<...Link>

DOM Status

Id:	in_use
DisplayName:	In Use

DOM Transition

Id:	new_to_in_use
FromStatusId:	new
ToStatusId:	in_use
FlowLevel:	0



DOM - Status System

Configuring the status system

DOM Behavior Definition

Id:	e2bbde66...
InitialStatusId:	new
Statuses:	List<DomStatus>
StatusTransitions:	List<DomTransition>
SectionDefinitionLinks:	List<...Link>

DOM Status Section Definition Link ID

Status ID:	new
SectionDefinitionId:	e7af7667...

DOM Status Field Descriptor Link

FieldDescriptorId:	36aff51b...
Visible:	true
RequiredForState:	true
ReadOnly:	false
ClientReadOnly:	false

DOM Status Section Definition Link

Id:	DomStatusSectionDefinitionLinkId
FieldDescriptorLinks:	List<...Link>



DOM - Status System

Configuring the status system

Visible: *

Should this field be visible to the user in this status?

RequiredForState:

Does a (valid) value for this field need to be present in this status?

ReadOnly:

Should this value be only read, and not updated in this status?
(on both UI and API level)

ClientReadOnly: *

Should this value only be read, and not updated in this status?
(only on UI level, not API level)

*** Only applies to the UI and not the DOM API**



DOM - Status System

Buttons & actions

- Buttons can be configured on the Behavior Definition, so they show up on the DOM form.
- Every button is linked to one DOM action, currently always a DataMiner script.
- Often used to facilitate the transitions.

VIH_2-AMQ-112_8

License Plate ⓘ
2-AMQ-112

Location ⓘ
Belgium

Capabilities ⓘ
HD

Size ⓘ
Medium

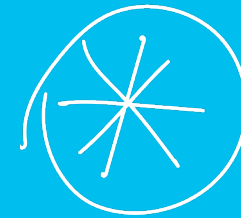
Number Of Cameras ⓘ
8

```
public class Script
{
    [AutomationEntryPoint(AutomationEntryPointType.Types.OnDomAction)]
    0 references | 0 changes | 0 authors, 0 changes
    public void OnDomActionMethod(IEngine engine, ExecuteScriptDomActionContext context)
    {
        var domInstanceId = context.ContextId as DomInstanceId;
        if (domInstanceId == null)
        {
            engine.ExitFail("The action was not triggered in the context of a DOM instance.");
            return;
        }

        var helper = new DomHelper(engine.SendSLNetMessages, domInstanceId.ModuleId);
        helper.DomInstances.DoStatusTransition(domInstanceId, "a_to_b");
    }
}
```



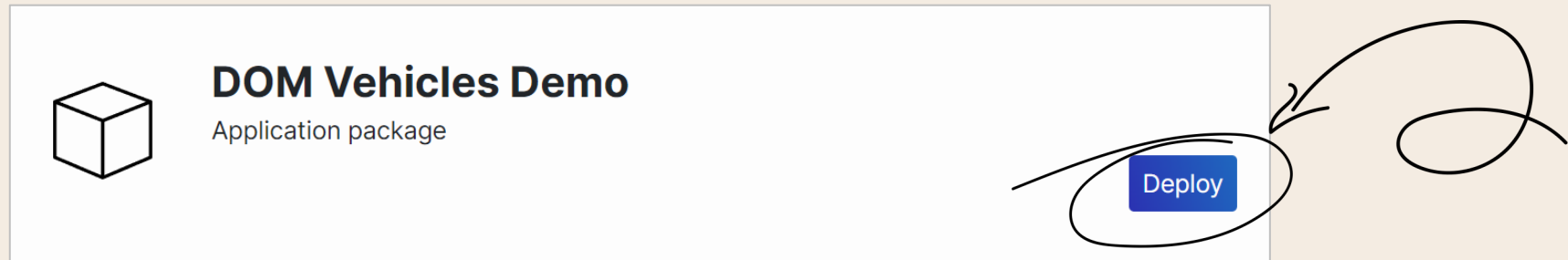
Status configuration walkthrough



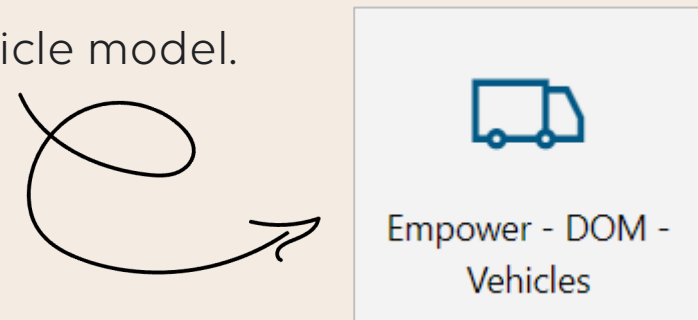
DOM - Status configuration walkthrough

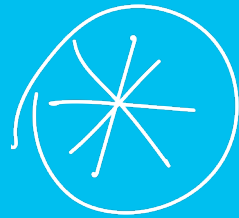
Let's see how the status system is configured for the vehicle demo

- You can follow along by deploying the '**DOM Vehicles Demo**' package from the catalog.

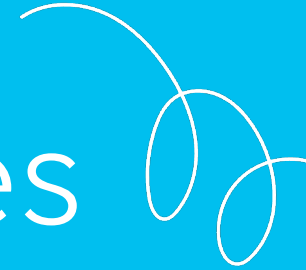


- Includes a low-code app to interact with the stateful vehicle model.





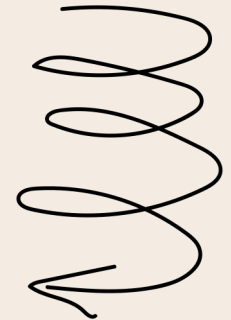
Best Practices



DOM - Best Practices

1. Group DOM definitions
2. Disable instance history
3. Use compact DOM instances
4. Optimize CRUD calls
5. Efficient scripting

More best practices are
also available in the
[DataMiner docs!](#)



DOM - Best Practices

1. Group DOM definitions

- Each DOM module has its **separate indexes in the Elasticsearch or OpenSearch database**.

These require a certain amount of system resources, which adds up over time.

Not recommended:

- Module: *people_app_offices*
 - Definition: Offices
- Module: *people_app_grouping*
 - Definition: Teams
 - Definition: Departments
- Module: *people_app_people*
 - Definition: People

Recommended:

- Module: *people_app*
 - Definition: Offices
 - Definition: Teams
 - Definition: Departments
 - Definition: People

Note:

Less relevant on SaaS due to how the data is stored.



DOM - Best Practices

2. Disable instance history

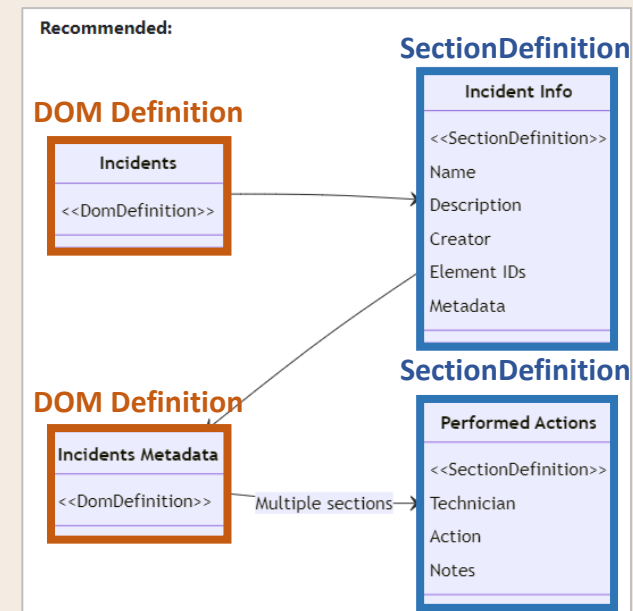
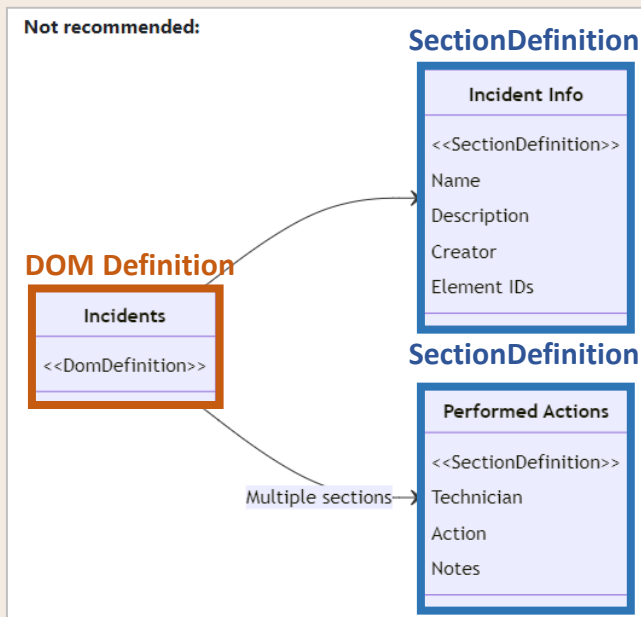
- By default, **any change** made to a DOM instance **is tracked** in a history record.
- Disabling the history **reduces the load on the system and database.**
- Especially important for DOM manager that see **frequent DOM instance updates.**
- Can be disabled on **module or DOM definition level.**



DOM - Best Practices

3. Use compact DOM instances

- The smaller the DOM instance, the faster it can be processed
- Tips:
 1. **Only include data that is actually required:** It is easier to add a field later, than to remove one.
 2. **Avoid data duplication:** Only store the same data once.
 3. **Avoid storing JSON in a string field:** Use multiple sections or other DOM instances instead.
 4. **Store rarely used (meta)data in separate DOM instance:** Prevent retrieving data that you do not need.



DOM - Best Practices

4. Optimize CRUD calls

- Every call to DataMiner and the database has a certain overhead. By reducing the number of calls, you can limit this overhead.
- Tips:
 - **Use bulk create, update, or delete whenever possible**
 - **Avoid doing multiple updates to the same DOM instance in the same script/code**
 - **Read all relevant DOM data in one call**

```
private List<DomInstance> GetDomInstances(DomHelper helper, List<DomInstanceId> ids)
{
    return Tools.RetrieveBigOrFilter(
        ids,
        id => DomInstanceExposers.Id.Equal(id),
        filter => helper.DomInstances.Read(filter));
}
```

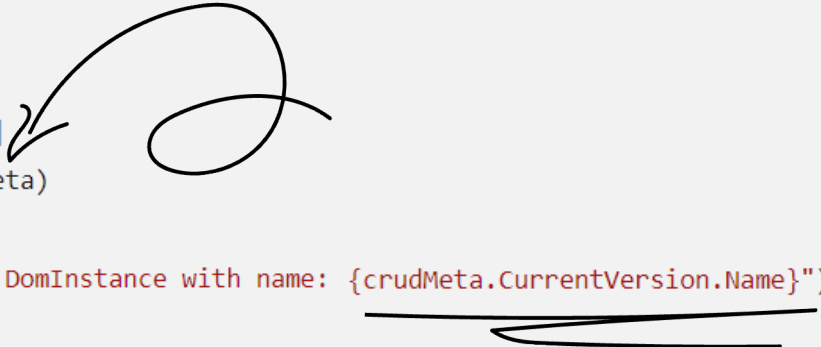


DOM - Best Practices

5. Efficient scripting

- DOM can be expanded upon using scripts. This gives a lot of freedom, but also open the door for potential inefficient usage. Always ensure that your code is efficient & fast.
- Tips:
 - **Avoid using CRUD scripts when there are many updates**
 - **Ensure that CRUD scripts & action scripts run fast:** It is advised to keep the execution of these scripts well within the milliseconds range.
 - **Use the 'FullCrudMeta' version of the CRUD scripts instead of the 'ID Only' variant**

```
public class Script
{
    [AutomationEntryPoint(AutomationEntryPointType.Types.OnDomInstanceCrudWithFullMeta)]
    public void OnDomInstanceCrudWithFullMeta(IEngine engine, DomInstanceCrudMeta crudMeta)
    {
        engine.GenerateInformation($"Script triggered for {crudMeta.CrudType} action on DomInstance with name: {crudMeta.CurrentVersion.Name}");
    }
}
```



What's new since last

Empower?

DOM - What's new since last Empower?

1. Bulk support for DOM instances
2. Caching of the configuration data
3. Soft-deletion of links and field descriptors
4. History settings on DOM definition level



DOM - What's new since last Empower?

1. Bulk support for DOM instances

- From DataMiner version **10.4.2 / 10.5.0**
- The API has been expanded to **accept multiple (up to 100) DOM instances** in one create, update or delete call.
- Performance **improved up to 20x!**

```
var domInstances = new List<DomInstance> { domInstanceOne, domInstanceTwo };  
domHelper.DomInstances.CreateOrUpdate(domInstances);
```

Create 100 **small** DOM instances

One-by-one
7,090 ms

In bulk
285 ms

Create 100 **large** DOM instances

One-by-one
9,220 ms

In bulk
1,597 ms



DOM - What's new since last Empower?

2. Caching of the configuration data

- From DataMiner version **10.3.9 / 10.4.0**
- All DOM configuration objects are stored in a distributed cache
(dom definitions, behavior definitions, section definitions)
- Can be disabled when they would misbehave in on an unstable system

Reading 1000 section definitions

<i>Before</i>	<i>Now</i>
1,050 ms	220 ms

```
2024/05/22 17:33:14.174 | SLNet.exe | CrudLoggerProxy | INF | 3 | 157 | Object: SectionDefinition, Forced: False, User: SKYLINE2\ThomasGH, Action: Reading (Paged:
2024/05/22 17:33:14.174 | SLNet.exe | CrudLoggerProxy | INF | 3 | 157 | Object: SectionDefinition, Forced: False, User: SKYLINE2\ThomasGH, Action: Read 1 objects.
```



DOM - What's new since last Empower?

3. Soft-deletion of links and field descriptors

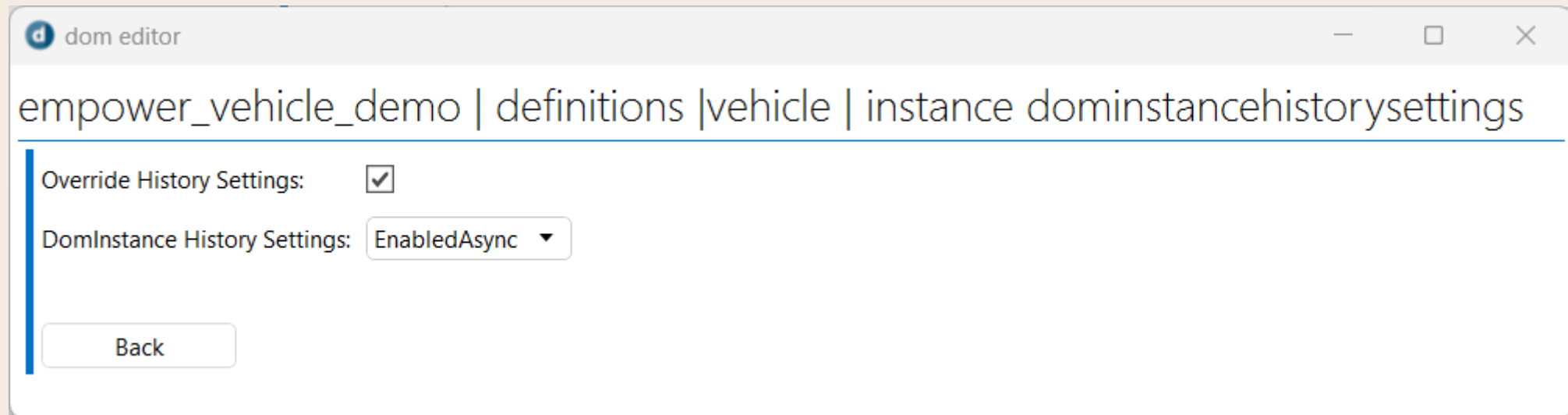
- From DataMiner version **10.3.9 / 10.4.0**
- Ability to soft-delete:
 - FieldDescriptors
 - SectionDefinitionLinks
 - DomStatusSectionDefinitionLinks
- More flexibility when the DOM model changes, but still allows existing data to be valid without needing to update all of them.
- Data can still exist, but cannot be updated anymore -> Only removed



DOM - What's new since last Empower?

4. History settings on DOM definition level

- From DataMiner version **10.4.4 / 10.5.0**
- Previously possible on the module settings, but **now also on DOM definition** level as an override.
- Prevents the need from having to split up your DOM module in multiple modules.





DOM in the
DataMiner Docs



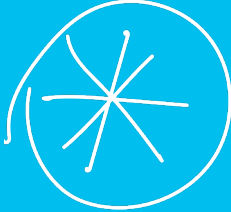
DOM - DataMiner Docs

Expand your DOM knowledge with the DataMiner Docs

- The [DataMiner Docs](https://aka.dataminer.services/DOM) contains nearly everything there is to learn of DOM.
- Getting started with DOM steps.
- Code examples
- Tutorials

<https://aka.dataminer.services/DOM>





Hands-on *e*
Extend our model

DOM - Hands-on

Expand our DOM model using the DOM editor

- **Goal:** Add another definition called '**Damage Reports**' that could be used to keep track of accidents. Use a **DOM instance field** to link these to vehicles.
- Fields:
 - **Vehicle** - DOM Instance Reference
 - **Date** - DateTime field
 - **Description** - Text field
 - **Driver** - User field
 - **Damage Location** - Enum (Front, Passenger Side, Back, Driver Side, Top, Internal...)
 - **Needs Immediate Maintenance** - Bool



ASK AWAY

Questions?



Explore

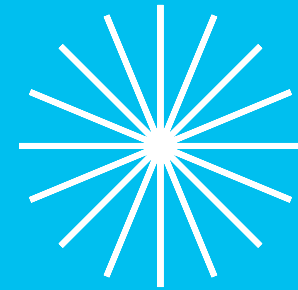


Chat Integration & Custom Commands

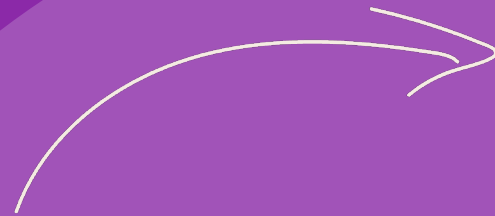
Elevate your Teams



with ChatOps!



YOUR HOST



Baptiste Pattyn

PRODUCT OWNER CLOUD



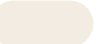
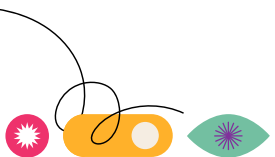
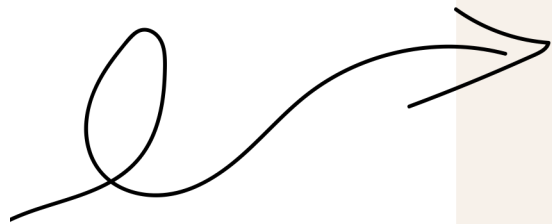
BAPTISTE.PATTYN@SKYLINE.BE

CATALOG
LIVE SHARING
CHAT OPS
REMOTE ACCESS

Agenda



- ChatOps
 - What is it?
 - Why do I need it?
 - How do I use it?
- Custom Commands vs Chat Integration
- Custom Command examples
- Chat Integration examples
- Exercise



Goals

Understand the
different parts of
ChatOps

Familiarize with
Custom
Commands and
Chat Integration

Hands-on
experience with
the DataMiner Bot

Configure and
Adjust
Automation
Scripts

Have fun!



Access Empower Tenant

<https://aka.dataminer.services/empower>

Registration form

- Scan the QR code or browse to the url
- Complete the form
- Click on the link in the invite that you should have received via email
 - Check your spam folder
- Verify access to Empower tenant



DataMiner Empower

* Required

1. Please enter your email address below *

2. First name *

3. Last name *

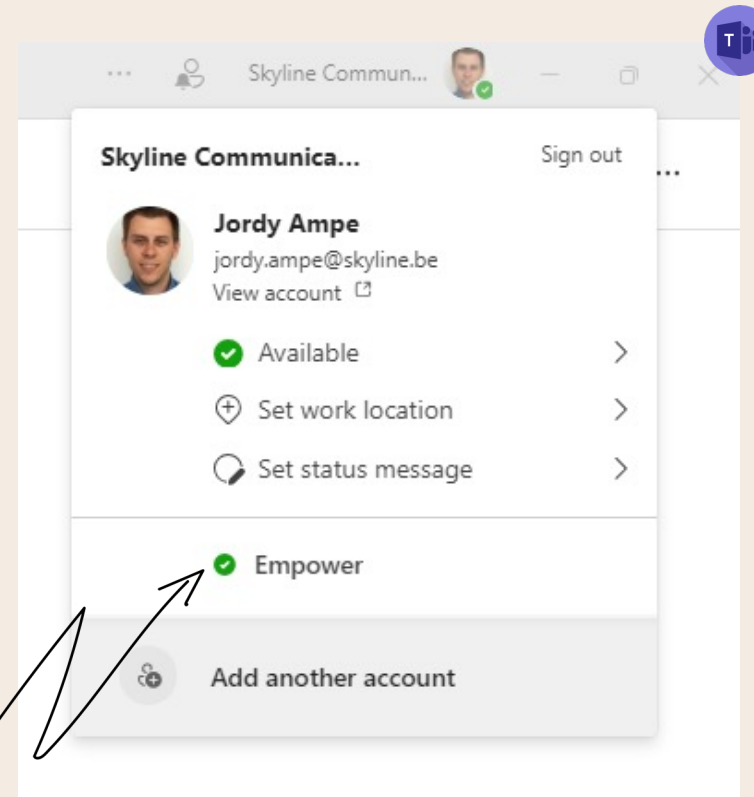
Submit



Access Empower Tenant

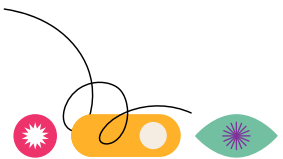
Validate access

- Open the Teams Desktop app or Teams web app <https://teams.microsoft.com/v2/>
- Sign in
- Click on your account in the top right
- Select “Empower”



ChatOps

Why?



ChatOps

Use case - Bookings



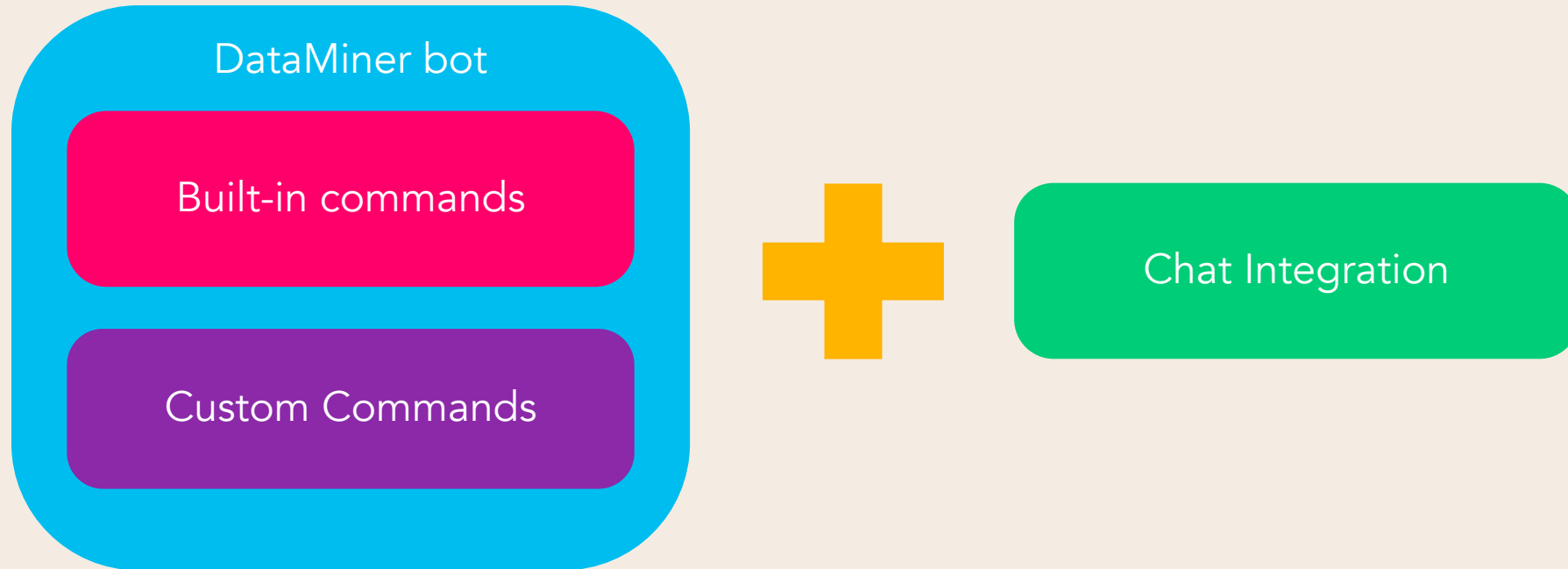
ChatOps

What is it and how does it work?



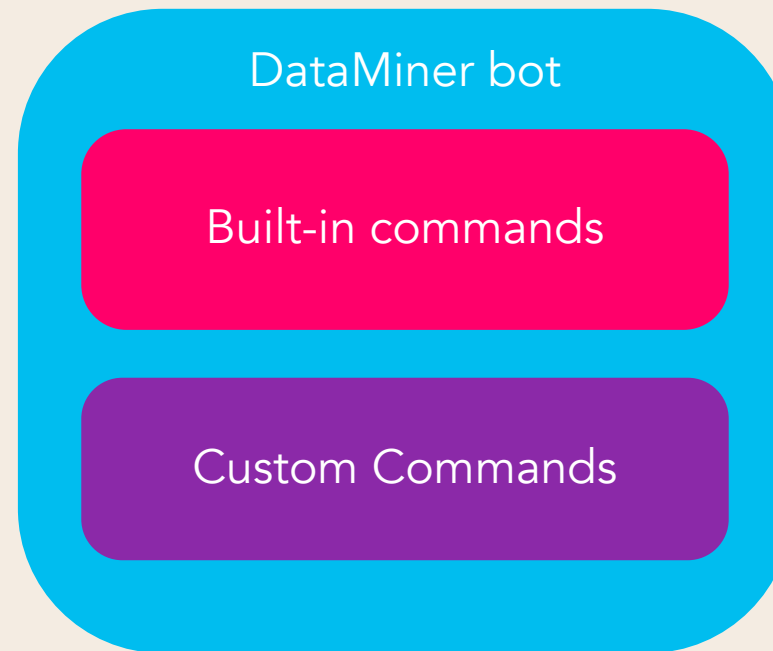
ChatOps

What is it?



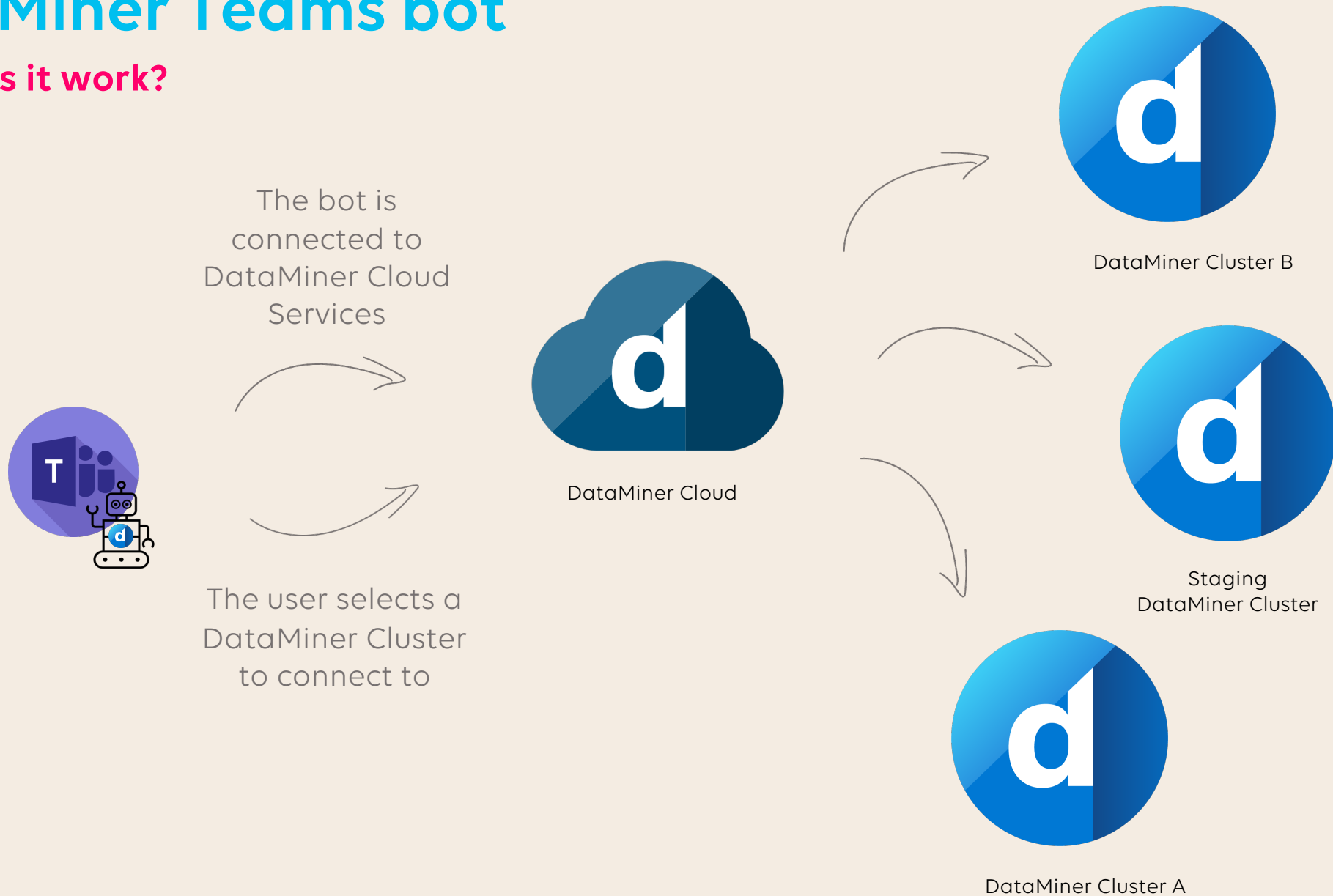
ChatOps

What is it?



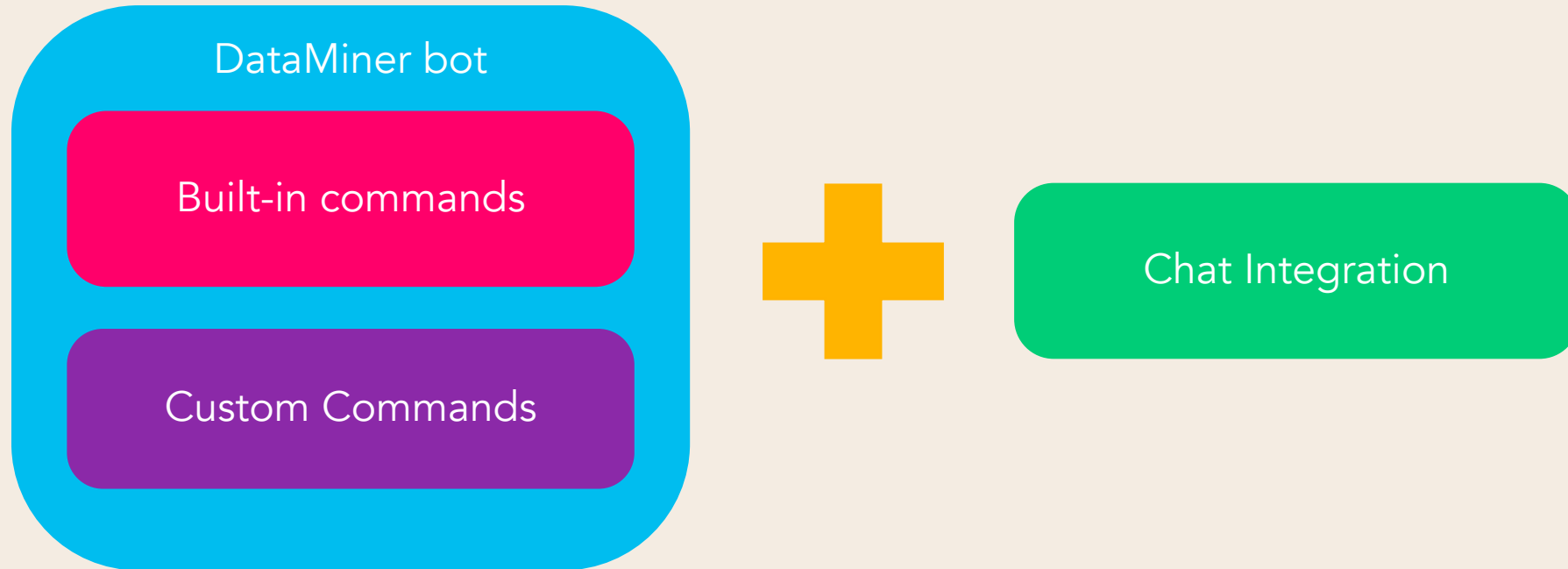
DataMiner Teams bot

How does it work?



ChatOps

What is it?



ChatOps

What is it?

Chat Integration



Chat Integration

How does it work?

Your Clusters are part
of a Cloud
Organization



DataMiner Cluster



DataMiner Cloud

Grant consent, to link
a DataMiner
Organization to your
Teams Tenant

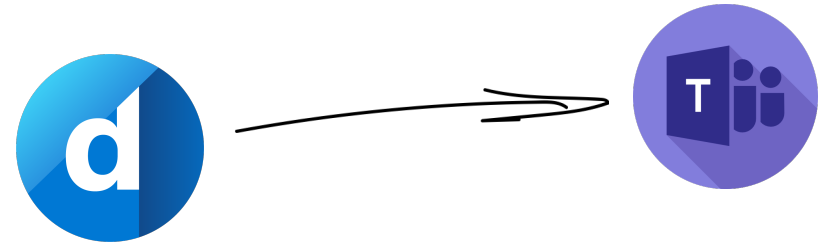


Your Teams Environment



Granting Admin Consent

Linking a Microsoft Teams environment to your DMS



Organization

- Overview
- Users
- Keys
- Audit
- Settings

Status

Verified Verified

License Development (10K shares)

Credits

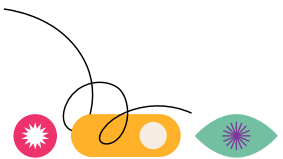
DataMiner Credits 9765

Usage

Concurrent shares 0 / 10000

Chat integration: Teams

Microsoft tenant ID
Not Configured Grant admin consent



Granting Admin Consent

Linking a Microsoft Teams environment to your DMS

The screenshot shows the Dataminer Admin interface. On the left is a navigation menu with 'Organization' selected, containing 'Overview', 'Users', 'Keys', 'Audit', and 'Settings'. The main content area is divided into four panels: 'Status' (Verified, License: Development (10K shares)), 'Credits' (DataMiner Credits: 9765), 'Usage' (Concurrent shares: 0 / 10000), and 'Chat integration: Teams' (Microsoft tenant ID: Not Configured). A button labeled 'Grant admin consent' is highlighted with a red circle and the number '1'.

The screenshot shows a Microsoft Teams admin consent dialog box. It features the Skyline Communications logo and the email address jan.vanhove@skyline.be. The title is 'Need admin approval'. The text states: 'Skyline Communications NV needs permission to access resources in your organization that only an admin can grant. Please ask an admin to grant permission to this app before you can use it.' There are two links: 'Have an admin account? Sign in with that account' and 'Return to the application without granting consent'.

What you would probably see



Granting Admin Consent

Linking a Microsoft Teams environment to your DMS

The screenshot shows the Dataminer Admin interface. On the left is a navigation menu with 'Overview', 'Users', 'Keys', 'Audit', and 'Settings'. The main content area is divided into four panels: 'Status' (Verified), 'Credits' (9765), 'Usage' (0 / 10000), and 'Chat integration: Teams' (Not Configured). A red circle with the number '1' highlights the 'Grant admin consent' button in the Teams panel.

The screenshot shows a Microsoft permissions request dialog. It displays the user 'demo.user@skyline.be' and the application 'DataMiner Skyline Communications NV'. The permissions requested are: Sign in and read user profile, Create channels, Add and remove members from all teams, and Create teams. The dialog includes a warning about data access and a link to report suspicious activity. At the bottom are 'Cancel' and 'Accept' buttons.

What an IT Admin would see



Granting Admin Consent

Linking a Microsoft Teams environment to your DMS

The screenshot shows the Dataminer Admin interface. On the left is a navigation menu with 'Overview', 'Users', 'Keys', 'Audit', and 'Settings'. The main content area is divided into four panels: 'Status' (Verified, License: Development (10K shares)), 'Credits' (DataMiner Credits: 9765), 'Usage' (Concurrent shares: 0 / 10000), and 'Chat integration: Teams' (Microsoft tenant ID: Not Configured). A button labeled 'Grant admin consent' is highlighted with a red circle and the number '1'.

The screenshot shows a Microsoft permissions request dialog. At the top is the Microsoft logo and the user email 'demo.user@skyline.be'. The title is 'Permissions requested Review for your organization'. Below this, it identifies the app as 'DataMiner' for 'Skyline Communications NV'. A list of permissions is shown: 'Sign in and read user profile', 'Create channels', 'Add and remove members from all teams', and 'Create teams'. A paragraph explains that accepting grants access to these resources for all users. A link to 'Show details' is provided. At the bottom are 'Cancel' and 'Accept' buttons.

What an IT Admin would see

Use these IT Admin credentials for our Empower Teams playground:

admin@4tk1h5.onmicrosoft.com

Empower2024!



Granting Admin Consent

Linking a Microsoft Teams environment to your DMS

The screenshot shows the Dataminer Admin interface. On the left is a navigation menu with 'Overview', 'Users', 'Keys', 'Audit', and 'Settings'. The main content area is divided into four panels: 'Status' (Verified, License: Development (10K shares)), 'Credits' (DataMiner Credits: 9765), 'Usage' (Concurrent shares: 0 / 10000), and 'Chat integration: Teams' (Microsoft tenant ID: Not Configured). A 'Grant admin consent' button is visible in the Teams panel, circled in red with the number '1' and an arrow pointing to the right.

The screenshot shows a Microsoft permissions request dialog. At the top is the Microsoft logo and the user email 'demo.user@skyline.be'. The title is 'Permissions requested Review for your organization'. Below this, it says 'DataMiner Skyline Communications NV'. A list of permissions is shown: 'Sign in and read user profile', 'Create channels', 'Add and remove members from all teams', and 'Create teams'. A paragraph explains that accepting grants access to these resources for all users. At the bottom are 'Cancel' and 'Accept' buttons.

The screenshot shows a confirmation dialog from Dataminer. The title is 'Link your Microsoft tenant with your Organization'. It displays the organization name 'Skyline Communications' and the Microsoft tenant ID '508e2982-7cfe-4647-832c-2d4fd6dc12b7'. At the bottom are 'Cancel' and 'Confirm' buttons.

Confirm the linking

What an IT Admin would see

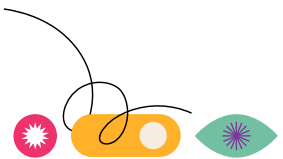
Use these IT Admin credentials for our Empower Teams playground:

admin@4tk1h5.onmicrosoft.com

Empower2024!

Custom Commands vs Chat Integration

What's the difference?



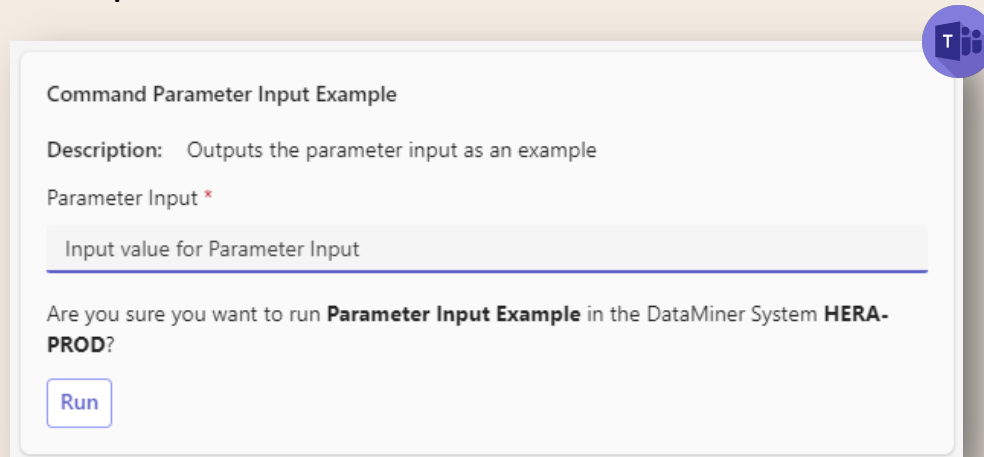
Custom Commands vs Chat Integration

Customize your ChatOps experience

Custom Commands



- Automation scripts in /bot/ folder
- Display custom output
- Triggered by a user
- Inputs available via interface

A screenshot of a chat interface showing a custom command configuration. The title is "Command Parameter Input Example". The description is "Outputs the parameter input as an example". There is a "Parameter Input" field with a red asterisk, containing the text "Input value for Parameter Input". Below the field is a confirmation question: "Are you sure you want to run **Parameter Input Example** in the DataMiner System **HERA-PROD**?" and a "Run" button. A small blue circular icon with a white 'T' and 'i' is in the top right corner of the screenshot.

Command Parameter Input Example

Description: Outputs the parameter input as an example

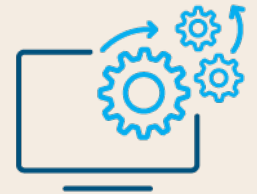
Parameter Input *

Input value for Parameter Input

Are you sure you want to run **Parameter Input Example** in the DataMiner System **HERA-PROD**?

Run

Chat Integration



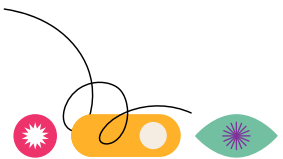
- Automation scripts
- Display custom output
- Triggered automatically by DataMiner

You can also define output buttons that will trigger other Custom Commands!

Tip

Channels vs Chats

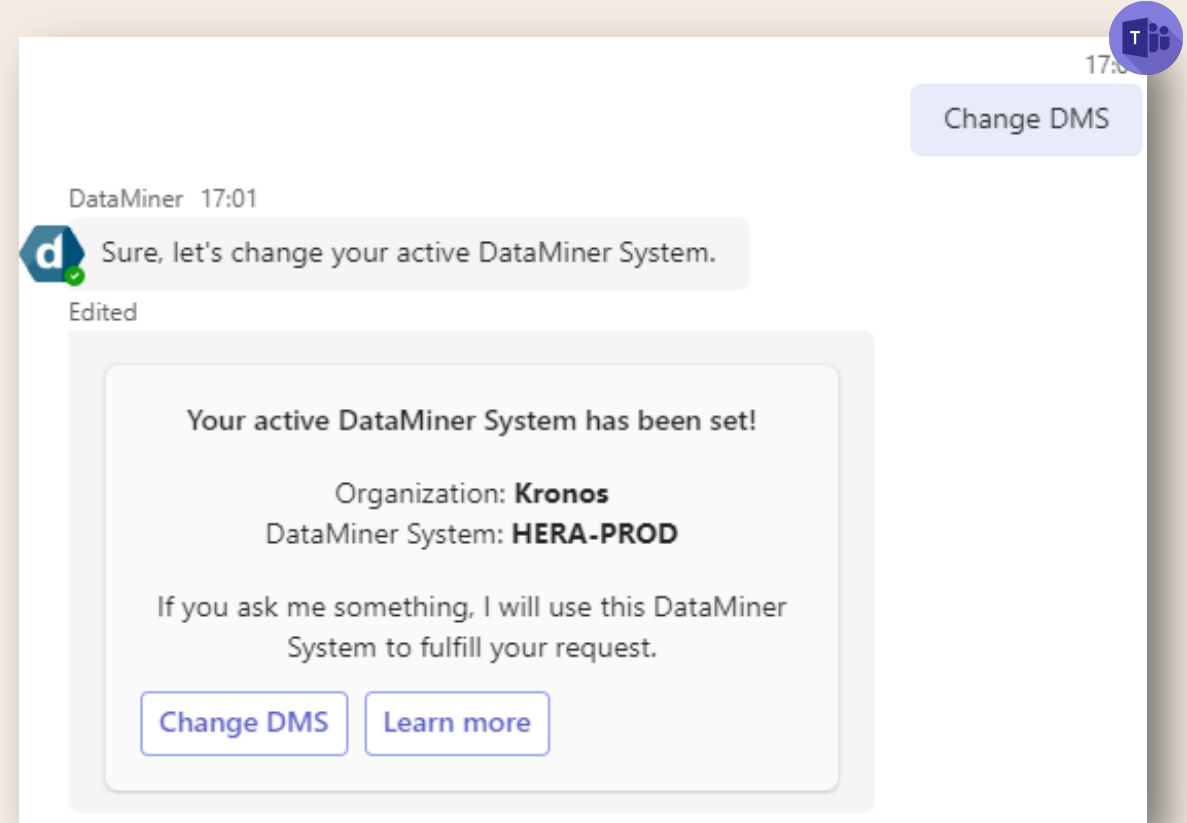
What's the difference when using the DataMiner bot?



Channels vs Chats

Chats

- Private conversation with the DataMiner bot
- 1 active DMS per chat



The screenshot shows a chat window with a 'Change DMS' button in the top right corner. A message from 'DataMiner' at 17:01 says, 'Sure, let's change your active DataMiner System.' Below this is an 'Edited' message box containing the following text:

Your active DataMiner System has been set!

Organization: **Kronos**
DataMiner System: **HERA-PROD**

If you ask me something, I will use this DataMiner System to fulfill your request.

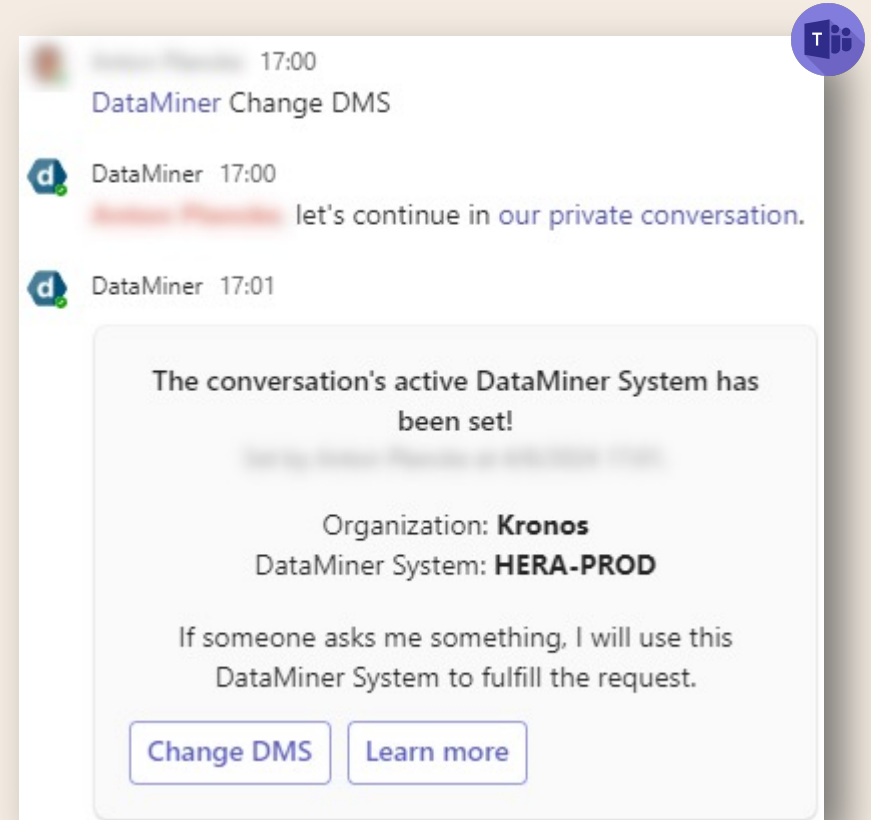
At the bottom of the message box are two buttons: 'Change DMS' and 'Learn more'.



Channels vs Chats

Channels

- Collaborate with the DataMiner bot together
- 1 active DMS per channel post
- Not everyone will have access
- Some commands will redirect to private chat



The screenshot shows a Microsoft Teams chat interface. At the top right, there is a circular icon with a 'T' and three people icons. The chat history includes:

- A message from 'James Thomas' at 17:00: "DataMiner Change DMS"
- A message from 'DataMiner' at 17:00: "let's continue in our private conversation."
- A message from 'DataMiner' at 17:01: "The conversation's active DataMiner System has been set!"

The message from DataMiner at 17:01 is enclosed in a light blue box and contains the following text:

The conversation's active DataMiner System has been set!

Organization: **Kronos**
DataMiner System: **HERA-PROD**

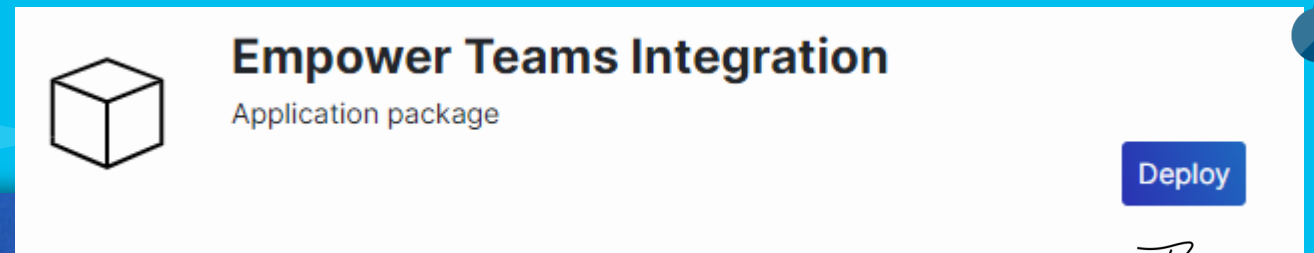
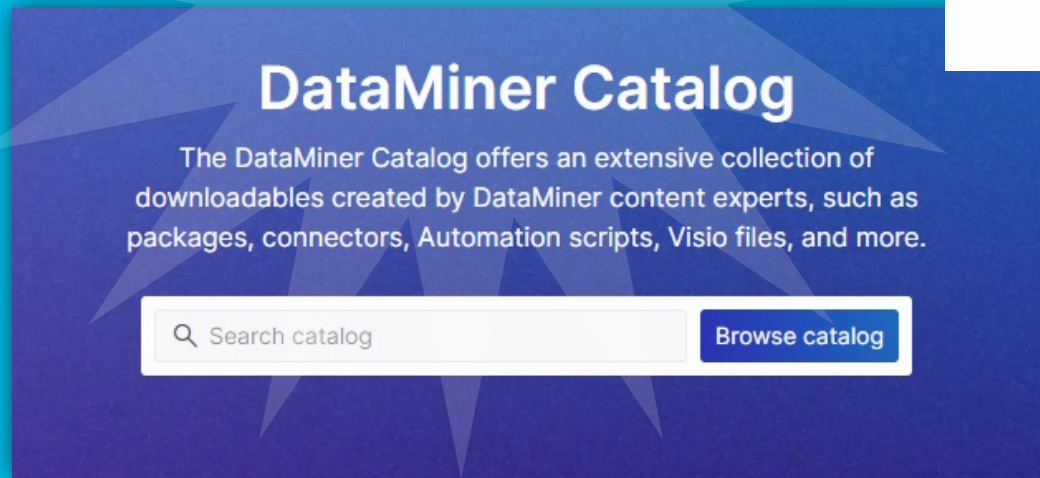
If someone asks me something, I will use this DataMiner System to fulfill the request.

At the bottom of the box are two buttons: "Change DMS" and "Learn more".



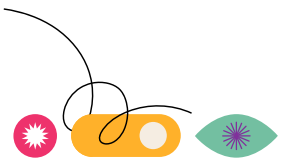
Hands-on time!

- Go to 'catalog.dataminer.services'
- Search for '[Empower Teams integration](#)'
- Deploy package to your DMS



DataMiner Teams Bot

Bots and DataMiner, the dynamic duo



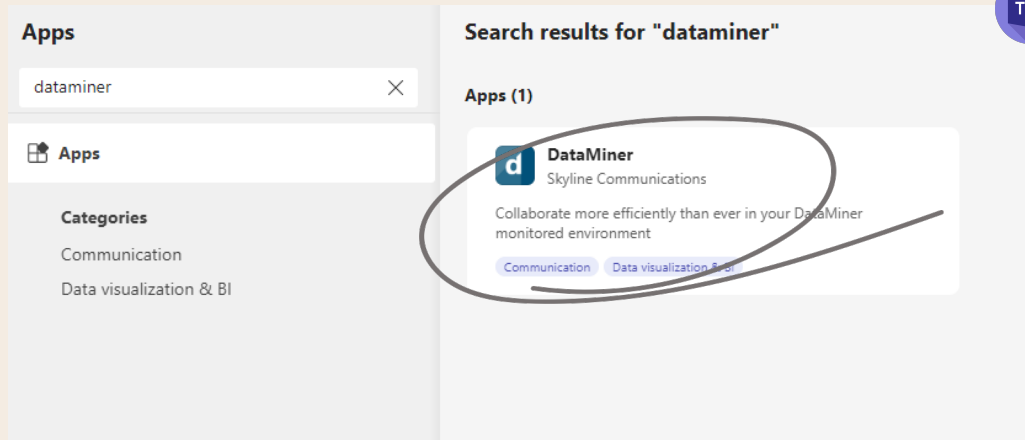
DataMiner Teams Bot

Installation



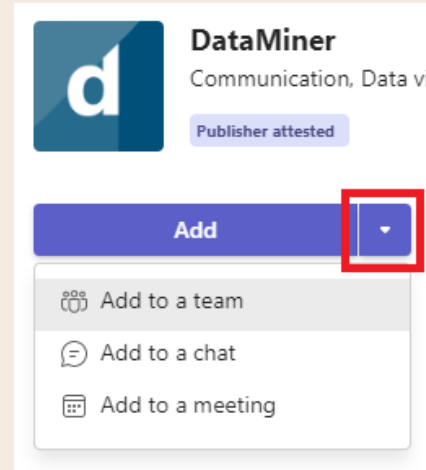
1

In MS Teams search the DataMiner App



2

Add to your Teams



3

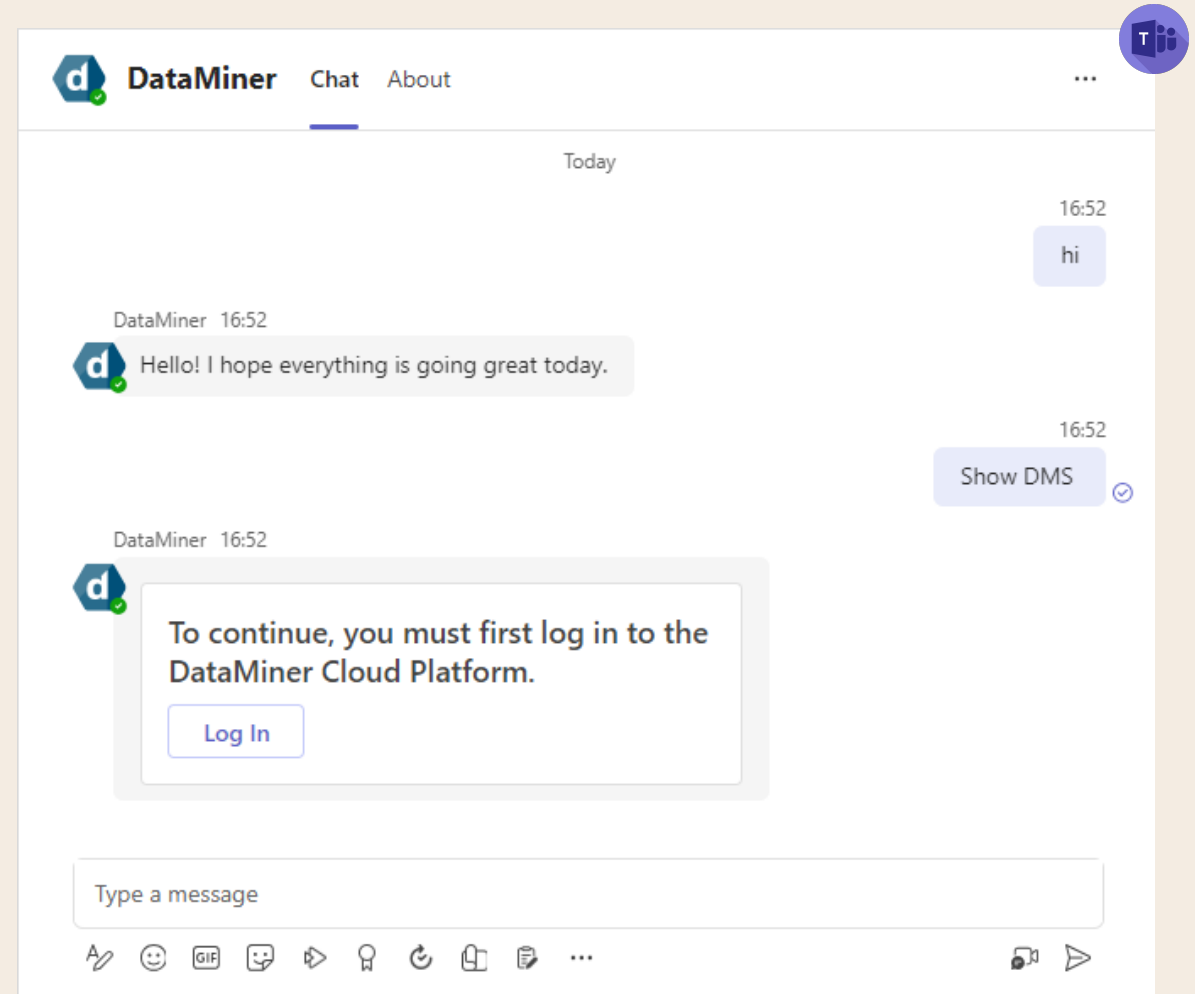
Ready to chat



DataMiner Teams Bot

Start a conversation – say hi

- Say “hi”
- Say “Show DMS”
- Click login



The screenshot shows a Microsoft Teams chat window with the DataMiner bot. The chat header includes the DataMiner logo, the name "DataMiner", and navigation links for "Chat" and "About". A "Today" separator is visible. The chat history shows the following messages:

- A user message at 16:52: "hi"
- A bot message at 16:52: "Hello! I hope everything is going great today."
- A user message at 16:52: "Show DMS"
- A bot message at 16:52: "To continue, you must first log in to the DataMiner Cloud Platform." with a "Log In" button.

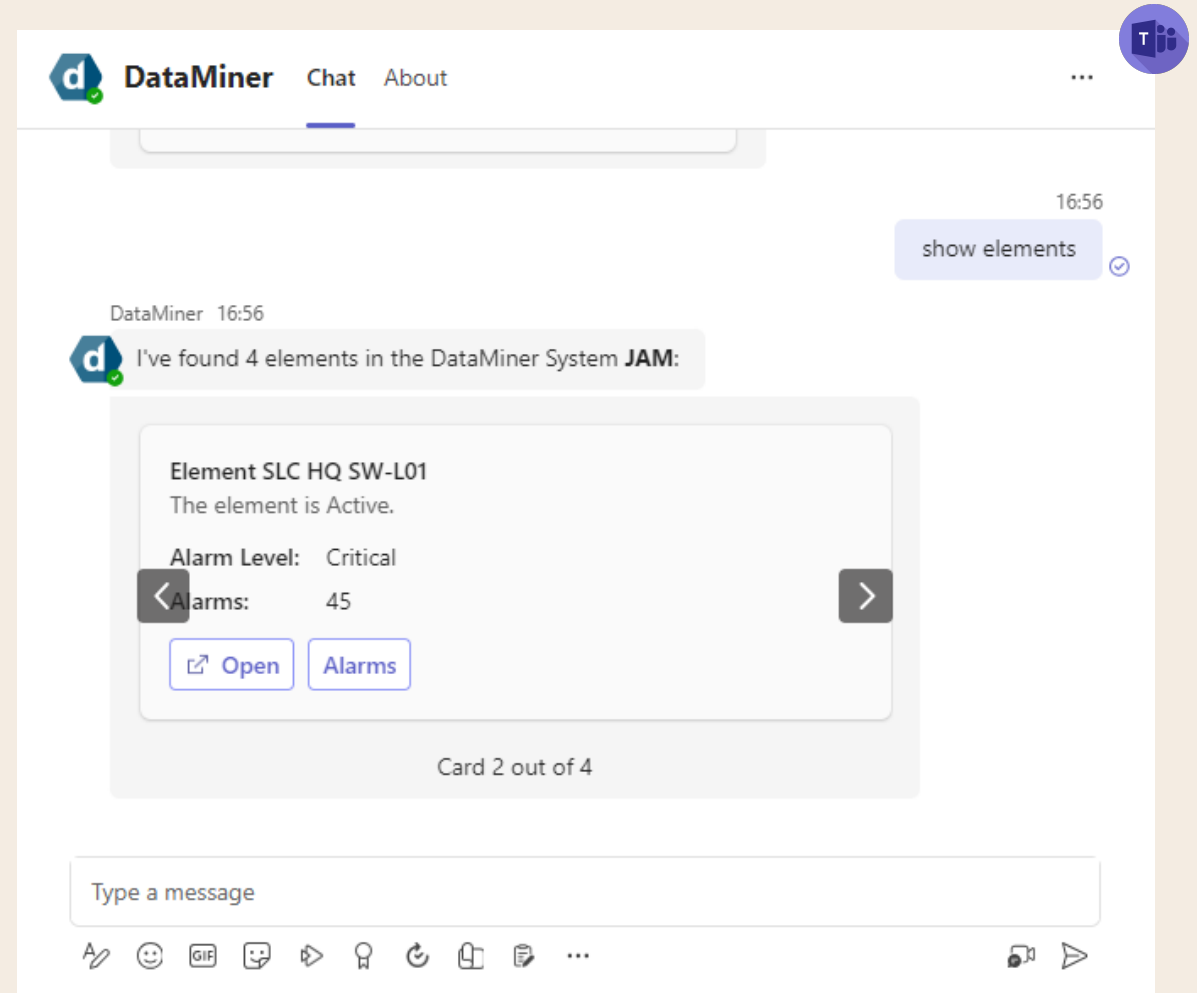
The chat input field at the bottom contains the placeholder text "Type a message". The bottom toolbar includes icons for emojis, GIFs, attachments, and other chat functions.



DataMiner Teams Bot

Start a conversation – find your element

- Say “show elements”
- Slide to element “SLC HQ SW-L01”
- Press “Alarms” button



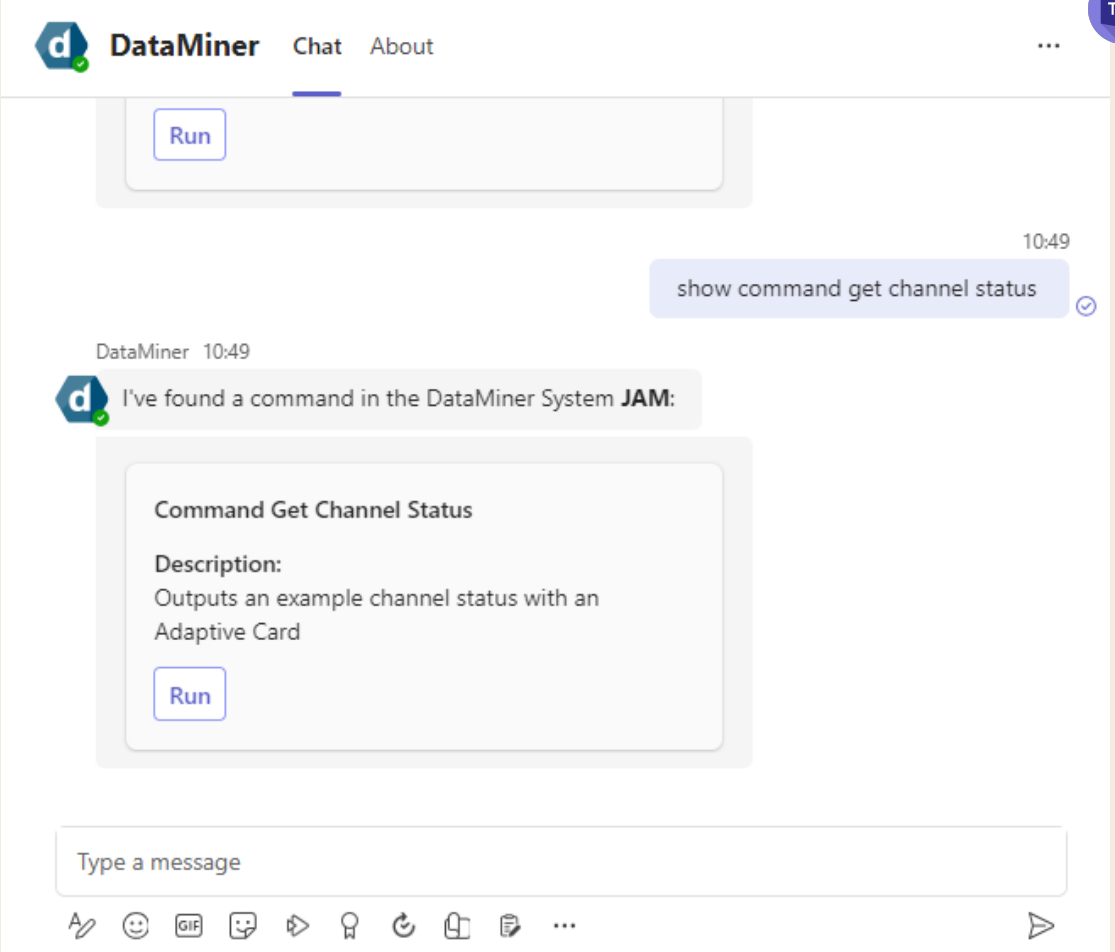
The screenshot shows a Microsoft Teams chat interface. At the top, the chat header includes the DataMiner logo, the name "DataMiner", and navigation options "Chat" and "About". A user profile picture is visible in the top right corner. The chat history shows a user message at 16:56 saying "show elements". The bot's response, also at 16:56, states "I've found 4 elements in the DataMiner System JAM:". Below this is a card for "Element SLC HQ SW-L01" with the status "The element is Active." and "Alarm Level: Critical". The card also displays "Alarms: 45" and includes "Open" and "Alarms" buttons. The card is labeled "Card 2 out of 4". At the bottom, there is a text input field with the placeholder "Type a message" and a row of icons for actions like copy, paste, and search.



DataMiner Teams Bot

Custom commands

- Say “show commands”
- Say “show command Get Channel Status”
- Press “run”



The screenshot shows a Microsoft Teams chat window with the DataMiner bot. The bot's header includes the DataMiner logo, the name "DataMiner", and navigation links for "Chat" and "About". A "Run" button is visible in the top right corner of the chat area. The chat history shows a user message: "show command get channel status" (10:49). The bot's response (10:49) is: "I've found a command in the DataMiner System **JAM**:". Below this is a card with the following content:

Command Get Channel Status

Description:
Outputs an example channel status with an Adaptive Card

Run

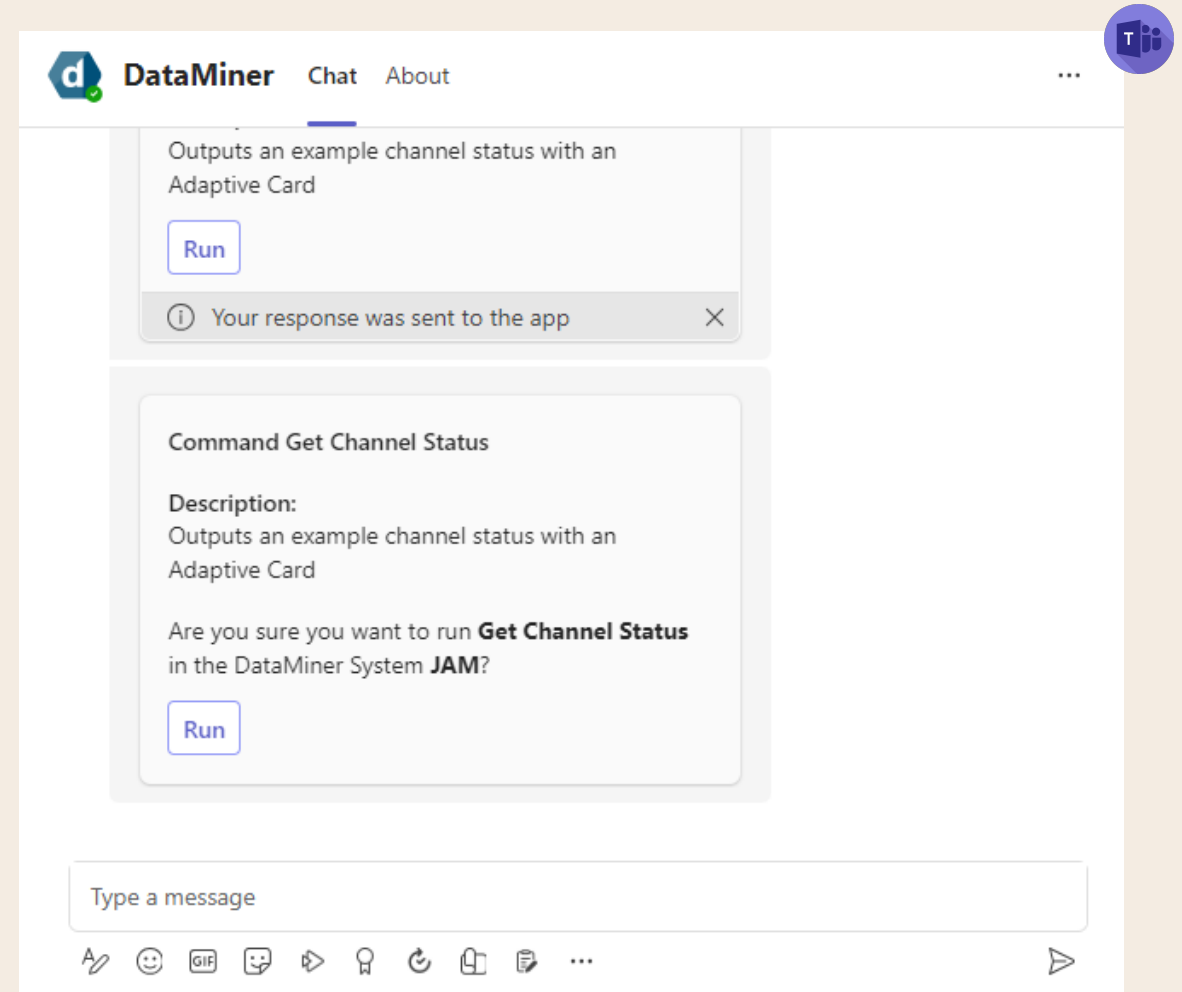
At the bottom of the chat window is a text input field labeled "Type a message" and a toolbar with icons for editing, emojis, GIFs, attachments, and other chat functions.



DataMiner Teams Bot

Custom commands

- Say “run **Get Channel Status**”
- Press “**Run**” to confirm



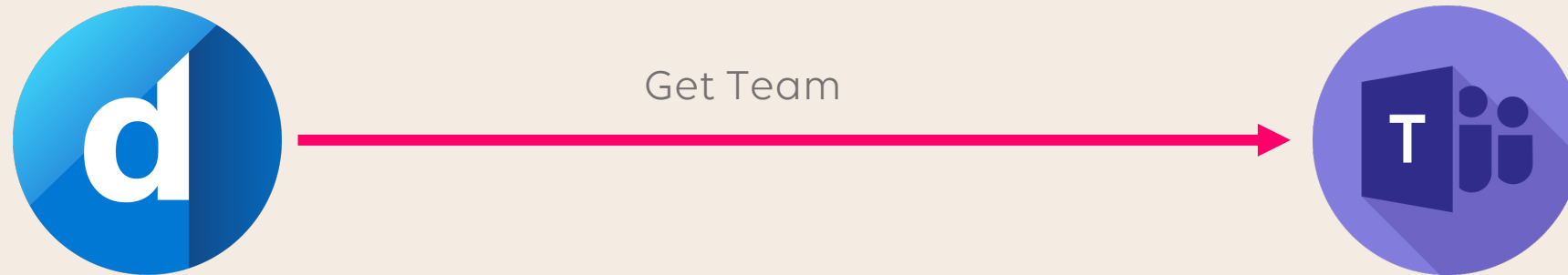
ChatOps Integration

Bridging the gap, DataMiner meets Teams



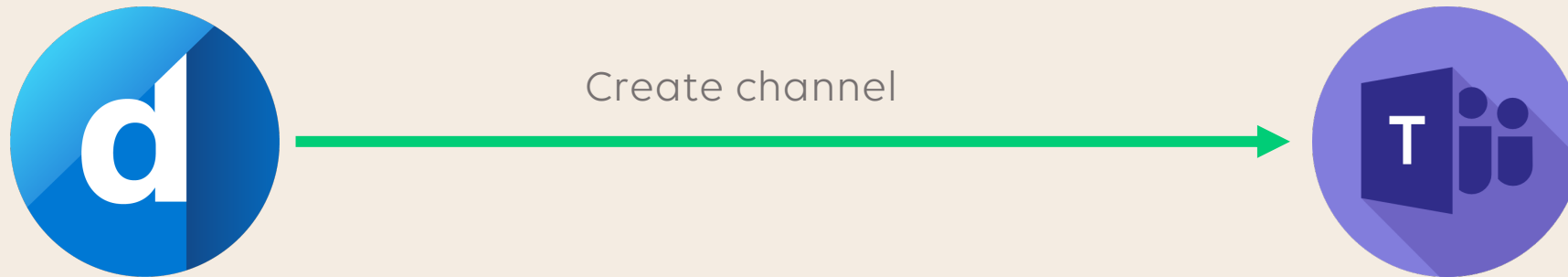
ChatOps Integration

Interact with Teams from DataMiner



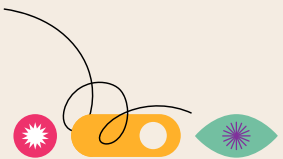
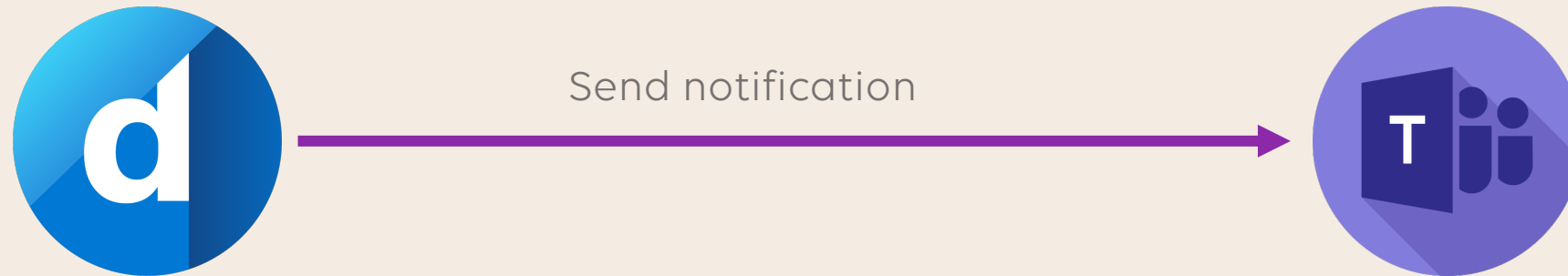
ChatOps Integration

Interact with Teams from DataMiner



ChatOps Integration

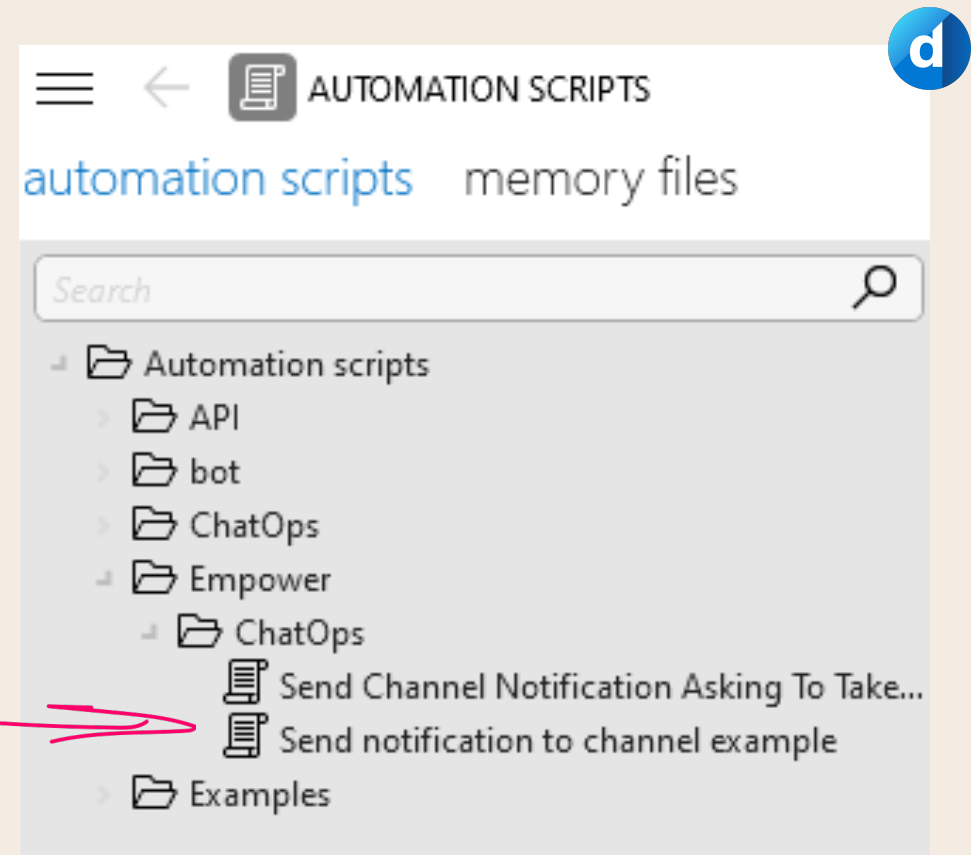
Interact with Teams from DataMiner



Chat Integration

Interact with Teams from DataMiner

- Open **Cube**
- Open the **Automation module** (Under Apps)
- Search for “**Send notification to channel example**”
Under Empower/ChatOps
- Select the script



Search

- Automation scripts
 - API
 - bot
 - ChatOps
 - Empower
 - ChatOps
 - Send Channel Notification Asking To Take...
 - Send notification to channel example
 - Examples

GENERAL

Name: Send notification to channel example

Description:

Show details

DUMMIES

Add

PARAMETERS

Parameter: Channel Name Values file: <Click to select> X

Parameter: Notification Values file: <Click to select> X

Add

MEMORY FILES

Add

ACTIONS

C# code

```

1 using System.IO;
2 using System.Linq;
3 using AdaptiveCards;
4 using Newtonsoft.Json;
5
6 namespace Teams_integration_example_1
7 {
8     using System;
9     using System.Collections.Generic;
10    using Skyline.DataMiner.Automation;
11    using Skyline.DataMiner.DcpChatIntegrationHelper.Common;
12    using Skyline.DataMiner.DcpChatIntegrationHelper.Teams;
13
14    /// <summary>
15    /// Represents a DataMiner Automation script.
16    /// </summary>
17    public class Script
18    {
19        /// <summary>
20        /// The script entry point.
21        /// </summary>
22        /// <param name="engine">Link with SLAutomation process.</param>
23        public void Run(IEngine engine)
24        {
25            var teamsIntegrationFilesFolder = "C:\\Skyline DataMiner\\Files\\TeamsIntegration";
26            var channelsFilePath = teamsIntegrationFilesFolder + "\\channels.json";
27            var teamsFilePath = teamsIntegrationFilesFolder + "\\teams.json";
28
29            try
30            {
31                Directory.CreateDirectory(teamsIntegrationFilesFolder);
32                if (!File.Exists(channelsFilePath))
33                {
34                    // Create the file in a safe way

```

C#

Validat

Advanced

New folder Add script Delete More...

Configure API... Execute Save script Discard



MEMORY FILES

[Add](#)

ACTIONS

C# code

```
1 using System.IO;
2 using System.Linq;
3 using AdaptiveCards;
4 using Newtonsoft.Json;
5
6 namespace Teams_integration_example_1
7 {
8     using System;
9     using System.Collections.Generic;
10    using Skyline.DataMiner.Automation;
11    using Skyline.DataMiner.DcpChatIntegrationHelper.Common;
12    using Skyline.DataMiner.DcpChatIntegrationHelper.Teams;
13
14    /// <summary>
15    /// Represents a DataMiner Automation script.
16    /// </summary>
17    public class Script
18    {
19        /// <summary>
20        /// The script entry point.
21        /// </summary>
22        /// <param name="engine">Link with SLAutomation process.</param>
23        public void Run(IEngine engine)
24        {
25            var teamsIntegrationFilesFolder = "C:\\Skyline DataMiner\\Files\\TeamsIntegration";
26            var channelsFilePath = teamsIntegrationFilesFolder + "\\channels.json";
27            var teamsFilePath = teamsIntegrationFilesFolder + "\\teams.json";
28
29            try
30            {
31                Directory.CreateDirectory(teamsIntegrationFilesFolder);
32                if (!File.Exists(channelsFilePath))
33                {
34                    // Create the file in a safe way
35                    File.WriteAllText(channelsFilePath, "");
36                }
37            }
38            catch { }
39        }
40    }
41 }
```

C#

[Validat](#)

Advanced

New folder

Add script

Delete

More...

Configure API...

Execute

Save script

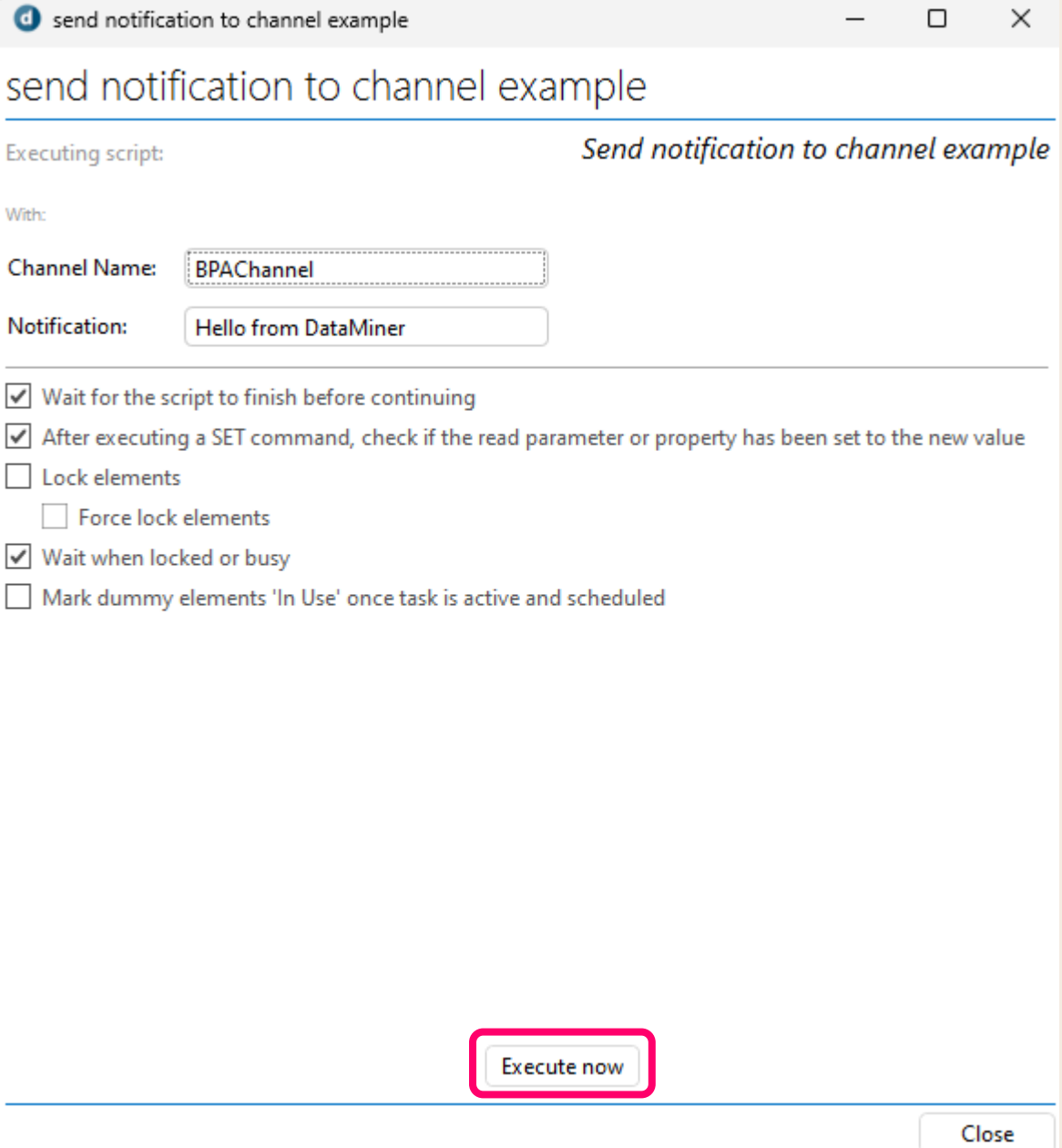
Discard



Chat Integration

Interact with Teams from DataMiner

- Fill in channel name
 - !! Include your initials !!
- Enter a custom notification
- Click “Execute now”
- Go to Teams and verify
 - Channel is created
 - Notification is sent

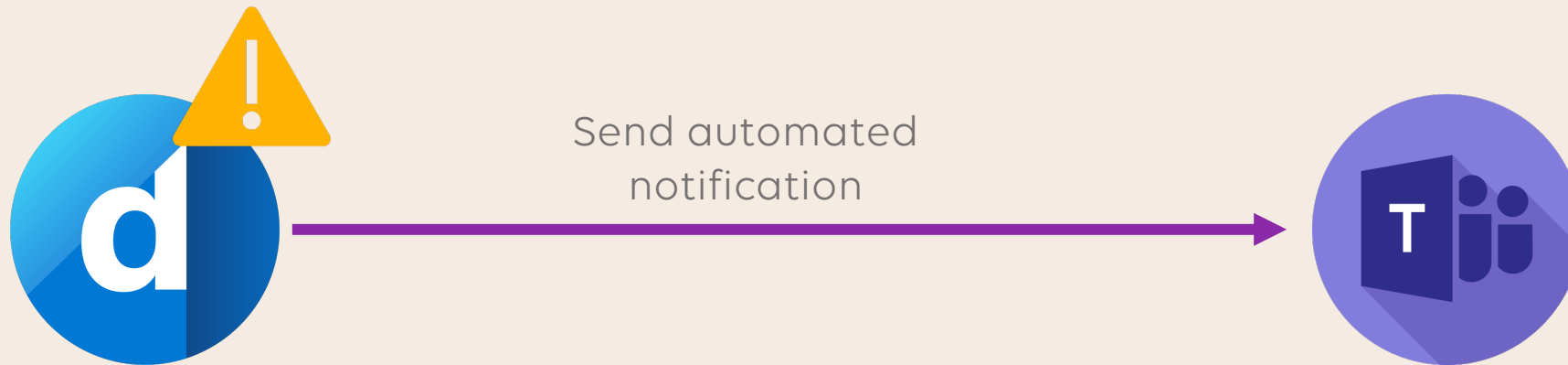


The screenshot shows a window titled "send notification to channel example". The main heading is "send notification to channel example". Below this, it says "Executing script: Send notification to channel example". Under "With:", there are two input fields: "Channel Name:" with the value "BPACChannel" and "Notification:" with the value "Hello from DataMiner". Below the input fields, there are several checkboxes: "Wait for the script to finish before continuing" (checked), "After executing a SET command, check if the read parameter or property has been set to the new value" (checked), "Lock elements" (unchecked), "Force lock elements" (unchecked), "Wait when locked or busy" (checked), and "Mark dummy elements 'In Use' once task is active and scheduled" (unchecked). At the bottom right, there is a button labeled "Execute now" which is highlighted with a red box, and a "Close" button.



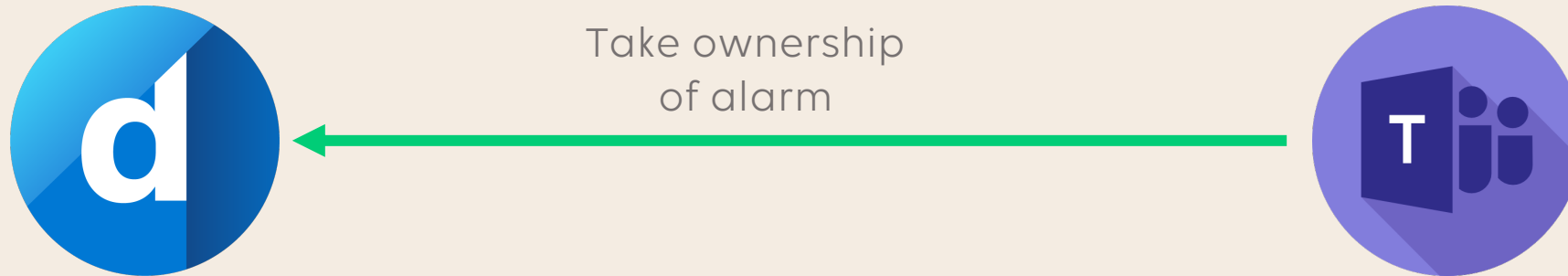
ChatOps Integration

Automatic notifications



ChatOps Integration

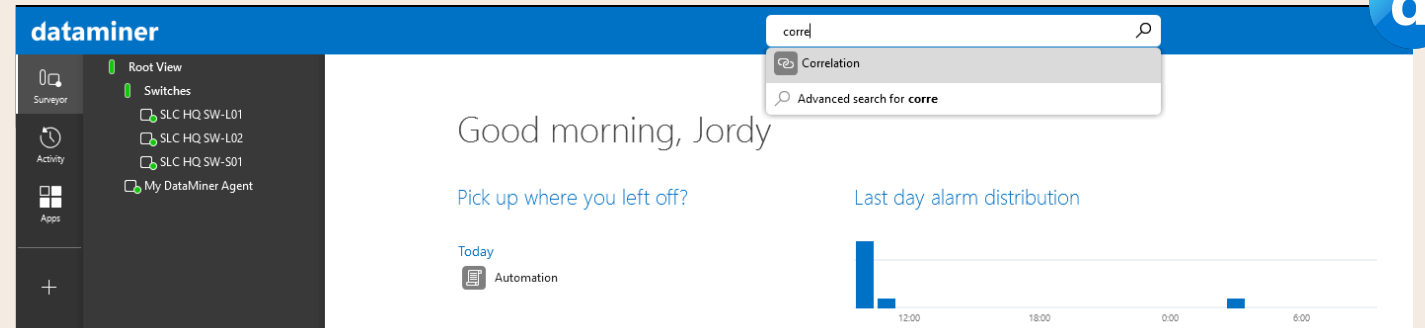
Automatic notifications



ChatOps Integration

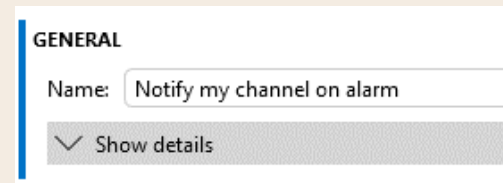
Automatic notifications: setup correlation rule

- Open Cube
- Open the **Correlation** module
- Press **“Add rule”** at the bottom



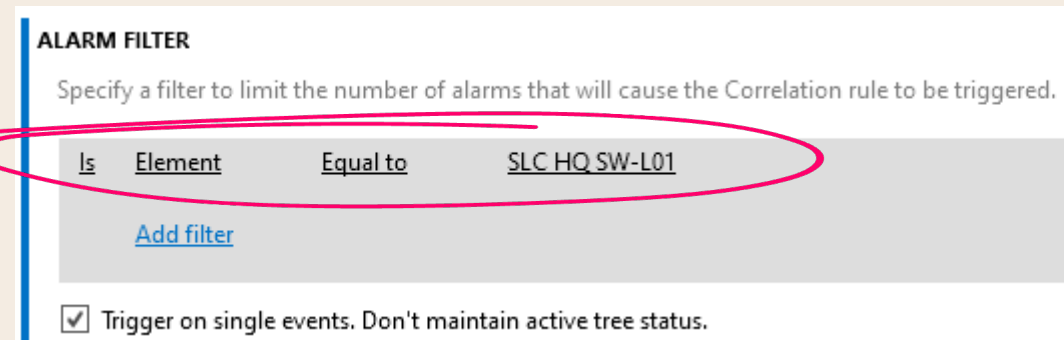
The screenshot shows the dataminer interface. On the left is a navigation menu with 'Surveyor', 'Activity', and 'Apps' sections. The 'Apps' section is expanded to show 'Root View', 'Switches', and 'My DataMiner Agent'. The 'Switches' section is further expanded to show 'SLC HQ SW-L01', 'SLC HQ SW-L02', and 'SLC HQ SW-S01'. The main content area displays a search bar with 'correl' entered, a search button, and a dropdown menu showing 'Correlation' and 'Advanced search for correl'. Below the search bar, there is a greeting 'Good morning, Jordy', a link 'Pick up where you left off?', and a 'Today' section with an 'Automation' icon. On the right, there is a 'Last day alarm distribution' bar chart showing a peak at 12:00 and a smaller peak at 6:00.

- Name it **“Notify my channel on alarm”**



The screenshot shows the 'GENERAL' configuration section. It has a title 'GENERAL' and a 'Name' field containing 'Notify my channel on alarm'. Below the name field is a 'Show details' button with a downward arrow icon.

- Add filter on element **“SLC HQ SW-L01”**



The screenshot shows the 'ALARM FILTER' configuration section. It has a title 'ALARM FILTER' and a description: 'Specify a filter to limit the number of alarms that will cause the Correlation rule to be triggered.' Below the description is a filter configuration table with columns for 'Is', 'Element', 'Equal to', and 'SLC HQ SW-L01'. The 'Element' and 'Equal to' columns are circled in red. Below the table is an 'Add filter' button. At the bottom, there is a checkbox labeled 'Trigger on single events. Don't maintain active tree status.' which is checked.

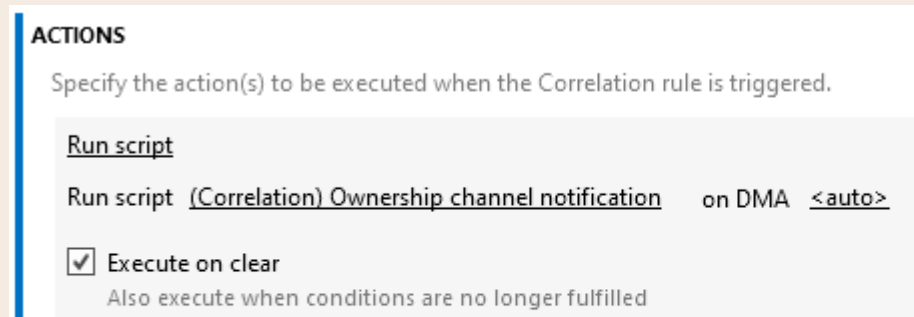


ChatOps Integration

Automatic notifications: setup correlation rule

Apply a “run script” action

- Select “(Correlation) Ownership channel notification”
- Check “Execute on clear”



ACTIONS

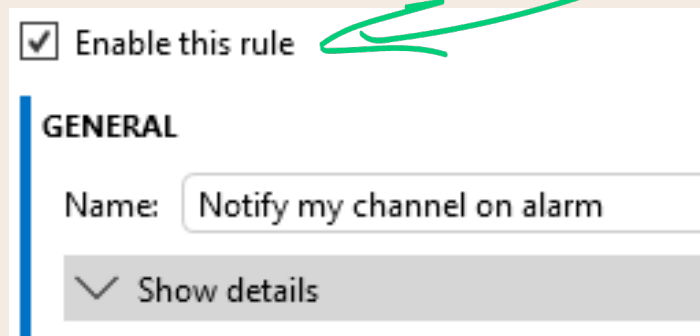
Specify the action(s) to be executed when the Correlation rule is triggered.

Run script

Run script (Correlation) Ownership channel notification on DMA <auto>

Execute on clear
Also execute when conditions are no longer fulfilled

- Click “Enable rule”
- Click “Apply”



Enable this rule

GENERAL

Name:

Show details



ChatOps Integration

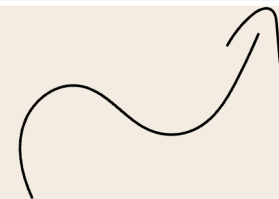
Automatic notifications: simulate alarm



Index	Display Key [IDX]	Description	Extended Description	Type	MTU	Speed	Flows	Physical Address	Admin Status	Oper. Status	Physical Conn
1	Ethernet1/	Ethernet1	Not initialized	Ethernet CSMACD	1500 B	10 Gbps	100	29:84:C1:8E:6B:01	Up	Up	Yes
2	Ethernet2/	Ethernet2	Not initialized	Ethernet CSMACD	1500 B	10 Gbps	100	29:84:C1:8E:6B:02	Up	Up	Yes
3	Ethernet3/	Ethernet3	Not initialized	Ethernet CSMACD	1500 B	10 Gbps	100	29:84:C1:8E:6B:03	Up	Up	Yes
4	Ethernet4/	Ethernet4	Not initialized	Ethernet CSMACD	1500 B	10 Gbps	100	29:84:C1:8E:6B:04	Up	Up	Yes
5	Ethernet5/	Ethernet5	Not initialized	Ethernet CSMACD	1500 B	10 Gbps	100	29:84:C1:8E:6B:05	Down	Down	No
6	Ethernet6/	Ethernet6	Not initialized	Ethernet CSMACD	1500 B	10 Gbps	100	29:84:C1:8E:6B:06	Down	Down	No
7	Ethernet7/	Ethernet7	Not initialized	Ethernet CSMACD	1500 B	10 Gbps	100	29:84:C1:8E:6B:07	Down	Down	No

Go to “SLC HQ SW-L01” and bring down “Ethernet1”

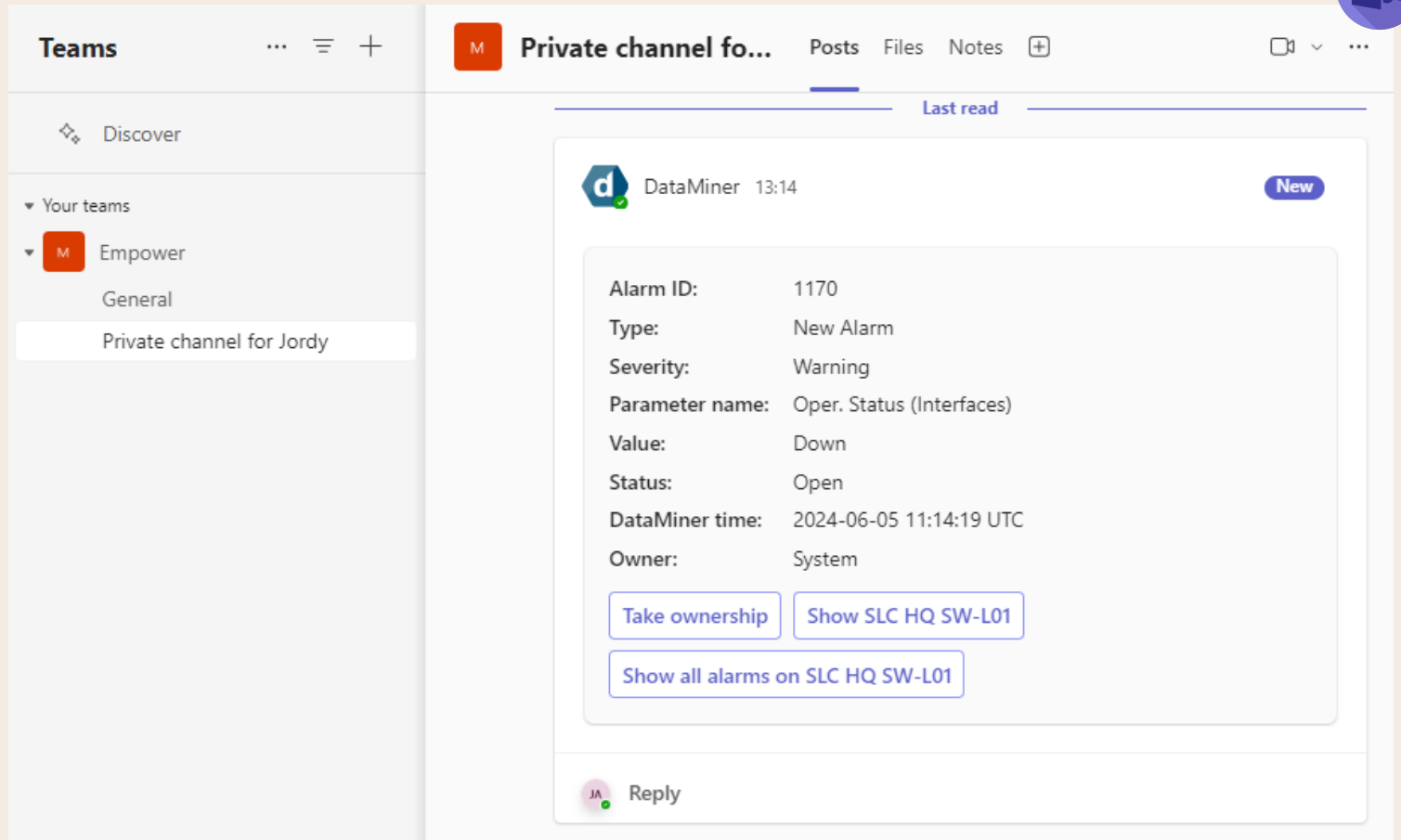
Index	Display Key [IDX]	Description	Extended Description	Type	MTU	Speed	Flows	Physical Address	Admin Status	Oper. Status	Physical Conn
1	Ethernet1/	Ethernet1	Not initialized	Ethernet CSMACD	1500 B	10 Gbps	100	29:84:C1:8E:6B:01	Down	Down	Yes



ChatOps Integration

Automatic notifications: take ownership of alarm

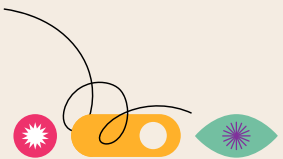
- Verify the notification in your Channel
- Press **“Take ownership”**



The screenshot displays the Microsoft Teams interface. On the left, the 'Teams' sidebar shows a list of channels under the 'Empower' team, with 'Private channel for Jordy' selected. The main view shows a private channel with a notification from 'DataMiner' at 13:14, marked as 'New'. The notification details are as follows:

Alarm ID:	1170
Type:	New Alarm
Severity:	Warning
Parameter name:	Oper. Status (Interfaces)
Value:	Down
Status:	Open
DataMiner time:	2024-06-05 11:14:19 UTC
Owner:	System

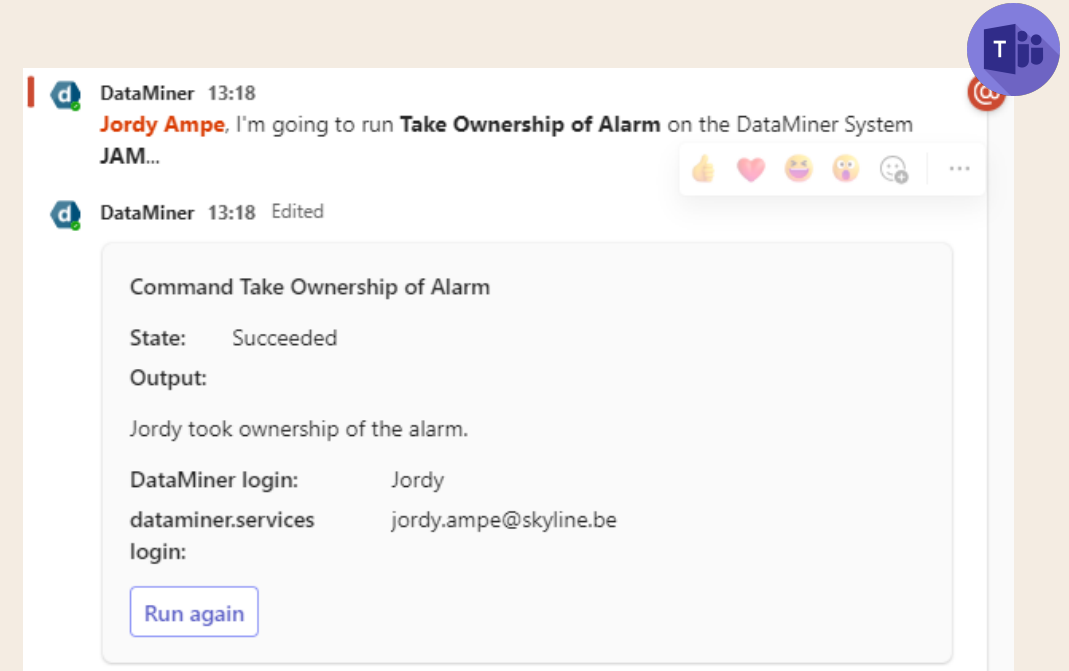
Below the notification, there are three buttons: 'Take ownership', 'Show SLC HQ SW-L01', and 'Show all alarms on SLC HQ SW-L01'. At the bottom, there is a 'Reply' button.



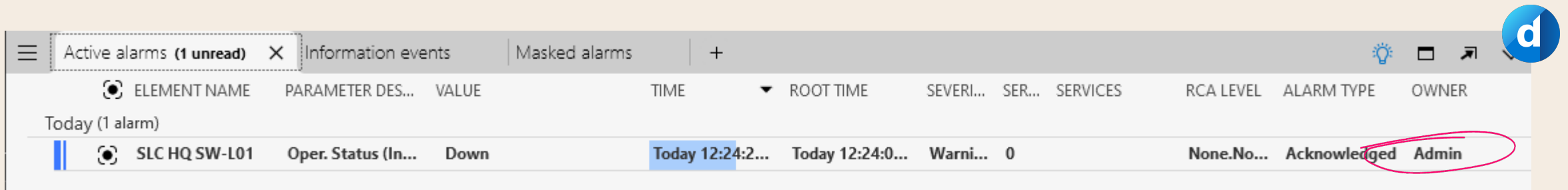
ChatOps Integration

Automatic notifications: take ownership of alarm

- Verify the custom command being executed
- Check ownership in Cube



The screenshot shows a chat interface with a message from 'DataMiner' at 13:18. The message text is: 'Jordy Ampe, I'm going to run **Take Ownership of Alarm** on the DataMiner System JAM...'. Below the message is a 'DataMiner' bot response at 13:18, labeled 'Edited'. The response contains a code block with the following text: 'Command Take Ownership of Alarm', 'State: Succeeded', 'Output: Jordy took ownership of the alarm.', 'DataMiner login: Jordy', 'dataminer.services login: jordy.ampe@skyline.be', and a 'Run again' button.



The screenshot shows the 'Active alarms' section of the Cube interface. The table has columns for ELEMENT NAME, PARAMETER DES..., VALUE, TIME, ROOT TIME, SEVERI..., SER..., SERVICES, RCA LEVEL, ALARM TYPE, and OWNER. A single alarm is listed: 'SLC HQ SW-L01' with 'Oper. Status (In...)' as the parameter, 'Down' as the value, and 'Admin' as the owner. The 'Admin' cell is circled in red.

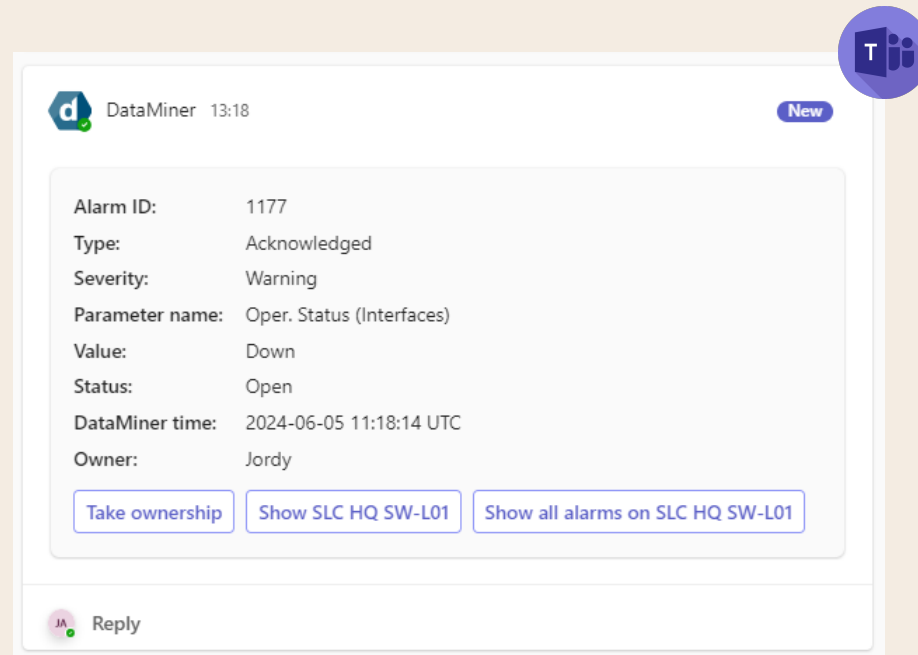
ELEMENT NAME	PARAMETER DES...	VALUE	TIME	ROOT TIME	SEVERI...	SER...	SERVICES	RCA LEVEL	ALARM TYPE	OWNER
SLC HQ SW-L01	Oper. Status (In...	Down	Today 12:24:2...	Today 12:24:0...	Warni...	0		None.No...	Acknowledged	Admin



ChatOps Integration

Automatic notifications: take ownership of alarm

- Verify a new notification about taking ownership



The screenshot shows a chat notification from DataMiner. The notification header includes the DataMiner logo, the name 'DataMiner', the time '13:18', and a 'New' badge. A circular profile picture of a person with a 'T' is visible in the top right corner. The main content of the notification is a list of alarm details:

Alarm ID:	1177
Type:	Acknowledged
Severity:	Warning
Parameter name:	Oper. Status (Interfaces)
Value:	Down
Status:	Open
DataMiner time:	2024-06-05 11:18:14 UTC
Owner:	Jordy

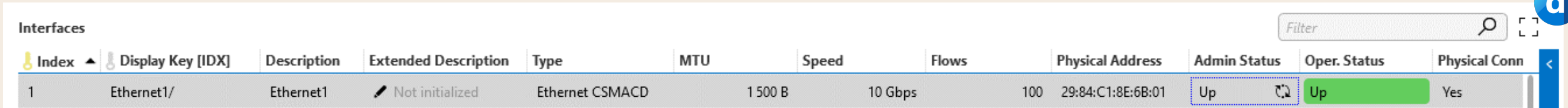
Below the details are three buttons: 'Take ownership', 'Show SLC HQ SW-L01', and 'Show all alarms on SLC HQ SW-L01'. At the bottom of the notification, there is a 'Reply' button with a small profile picture icon.



ChatOps Integration

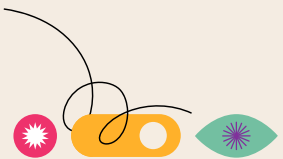
Automatic notifications: resolve alarm

Go to “SLC HQ SW-L01” and bring “Ethernet1” back up



The screenshot shows a network interface configuration table. The table has columns for Index, Display Key [IDX], Description, Extended Description, Type, MTU, Speed, Flows, Physical Address, Admin Status, Oper. Status, and Physical Conn. The first row shows an interface named Ethernet1/ with a status of Up. A hand-drawn arrow points from the Admin Status column to the Oper. Status column.

Index	Display Key [IDX]	Description	Extended Description	Type	MTU	Speed	Flows	Physical Address	Admin Status	Oper. Status	Physical Conn
1	Ethernet1/	Ethernet1	✍ Not initialized	Ethernet CSMACD	1500 B	10 Gbps	100	29:84:C1:8E:6B:01	Up	Up	Yes



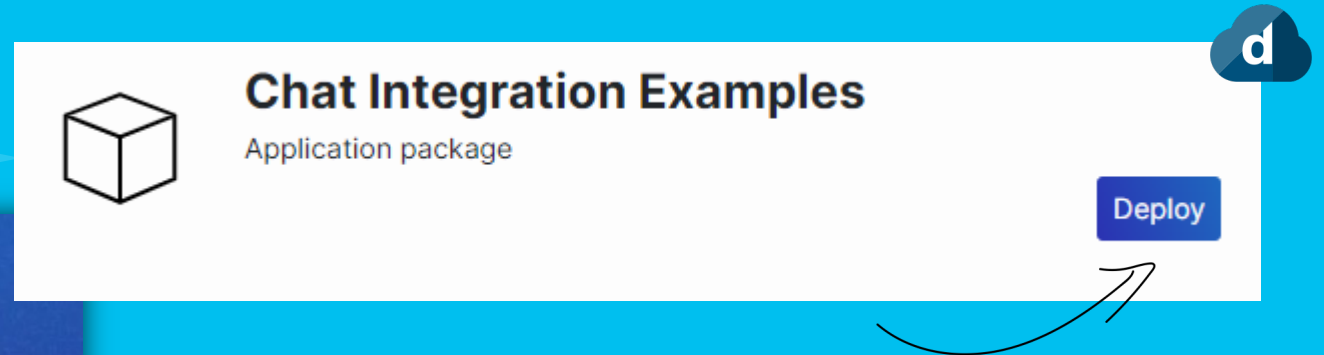
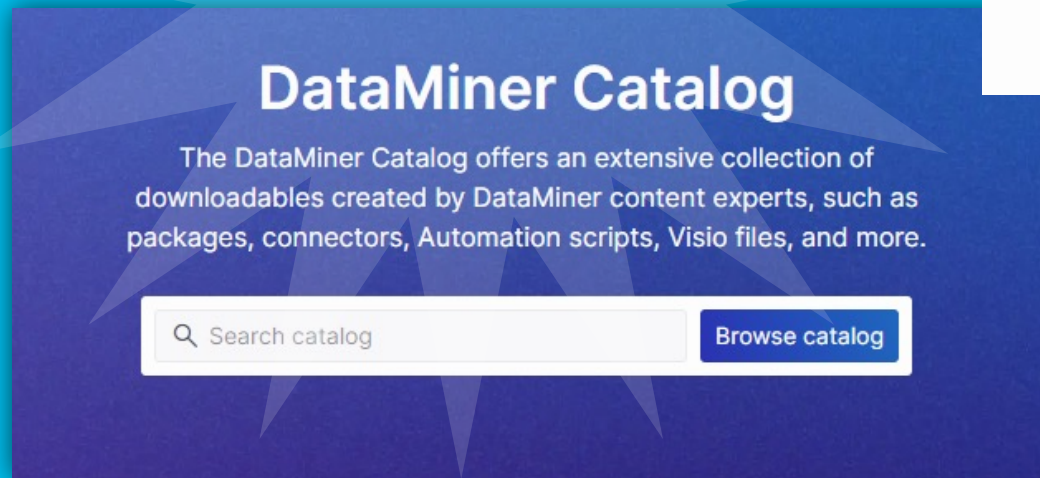


Let's go all the way!

Create your first
Chat Integration
with DataMiner

Hands-on time!

- Go to 'catalog.dataminer.services'
- Search for '**Chat Integration Examples**'
- Deploy package to your DMS



Exercise

Creating a custom command to send a notification to the general channel

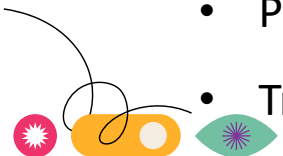
- Duplicate 'Send Channel Notification Example'
 - Name it 'Notify general channel'
 - Create a new folder 'bot' and move the script in there
 - Add a parameter input "dataminer.services User Email" to identify the user who pressed the button
 - Modify the notification to include the value from the "dataminer.services User Email" input

Finished? Continue the journey with some more advanced steps

- Modify the "Send channel notification asking to take ownership"
 - Add the "Notify general channel" custom command as a button (similar to the take ownership button in that script)
 - Predefine the channel name and notification input
 - Trigger a new alarm and click the button in the notification

The "dataminer.services User Email" is a unique parameter, it will automatically be filled in and will not be requested to the user

Tip

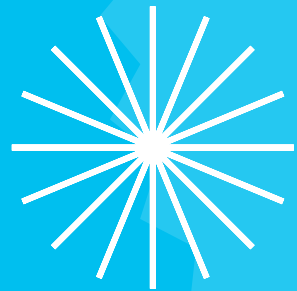


ASK AWAY

Questions?



Unlock GQI's



Full potential

YOUR HOST

Sebastiaan Dumoulein



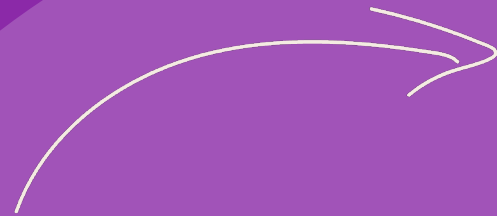
PRODUCT OWNER DATA EXPLORATION



SEBASTIAAN.DUMOULEIN@SKYLINE.BE

VISUAL OVERVIEW
DASHBOARDS
LOW-CODE APPS
GQI

YOUR HOST

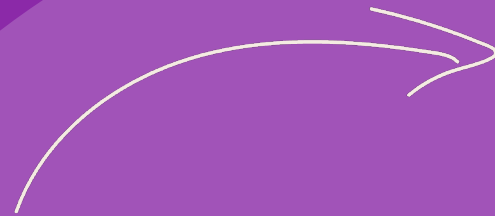


Ward
Haeck

SENIOR DEVOPS ENGINEER

 WARD.HAECK@SKYLINE.BE

YOUR HOST



Wim Bruynooghe

PRINCIPAL DEVOPS ENGINEER – DATA EXPLORATION



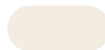
WIM.BRUYNNOOGHE@SKYLINE.BE

VISUAL OVERVIEW
DASHBOARDS
LOW-CODE APPS
GQI

Agenda



1. What is GQL?
2. What are queries?
3. Query exercises
4. Why extending GQL?
5. Reuse existing extensions
6. The power of packages
7. Creating our own extensions **Advanced**
8. The future of GQL



Goals

GQI Fundamentals

We understand the concept of GQI and queries

We can use data sources and operators

GQI Extensions

Understand why we sometimes need to extend GQI

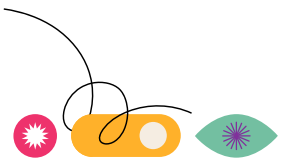
We can extend GQI by leveraging the Catalog

We understand how GQI Extensions work (Optional)



What is GQL?

Ssssh, it's magic...



What is GQI?

The abstraction layer we needed

Generic Query Interface

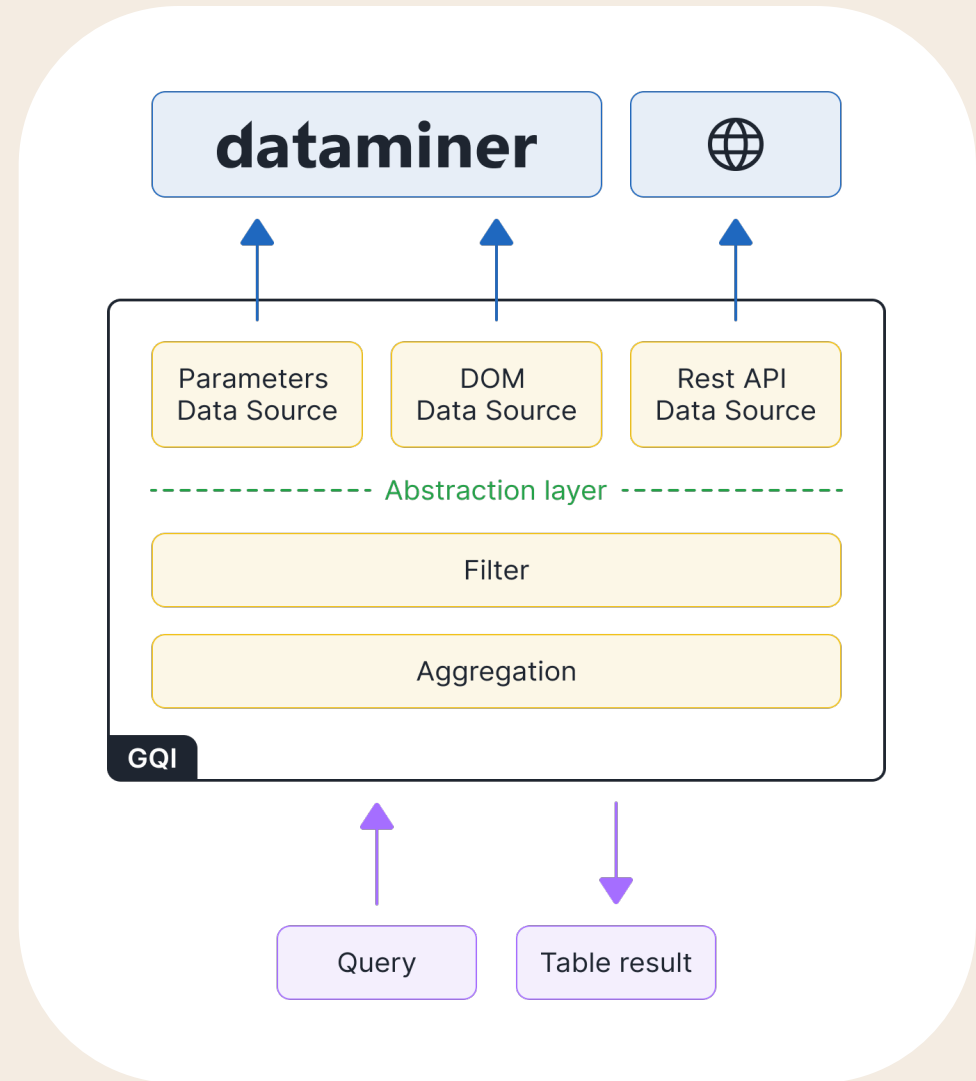
Retrieve and transform data from both inside and outside a DataMiner System

Why?

- Many diverse data sources
- Same operations and visualizations

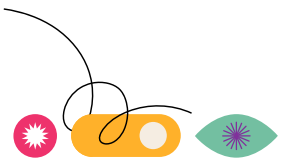
Solution

- Unified way to retrieve and transform data
- Common data format for visualizations



What are queries?

You talking to me?



What are queries?

- Similarities with other querying languages
- Exists of
 - **One data source**
 - **Zero or more operators**
- Built through a **conversational API**
- Stored in your dashboard or Low-Code app

```
SELECT *  
FROM Alarms  
WHERE Severity  
LIKE '%Warning%'
```

```
SELECT Severity, Count(*)  
FROM Alarms  
GROUP BY Severity
```



Dashboards



Product catalog



Infrastructure
Monitoring



Ordering portal
ZIINE



People &
Organizations



What are queries?

Data sources you say?

Identifies what data should be fetched



DataMiner

Alarms

Bookings

DOM instances

Parameters

Services



Any external data

API endpoint

Database

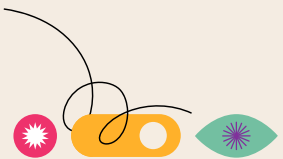
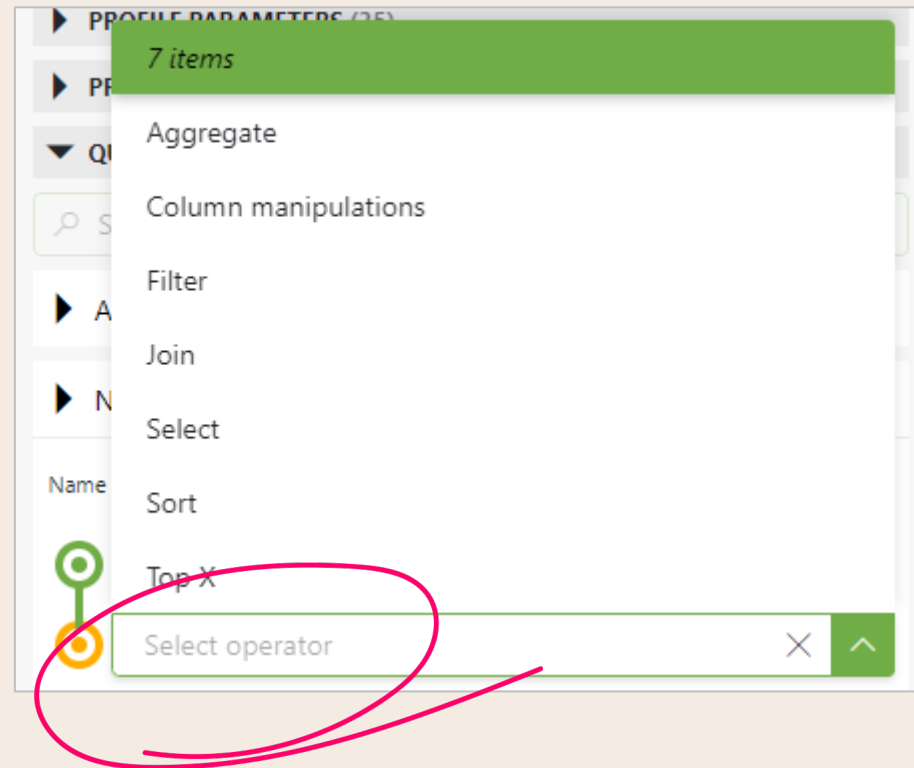
File storage
(CSV, JSON, XML)



What are queries?

Operators you say?

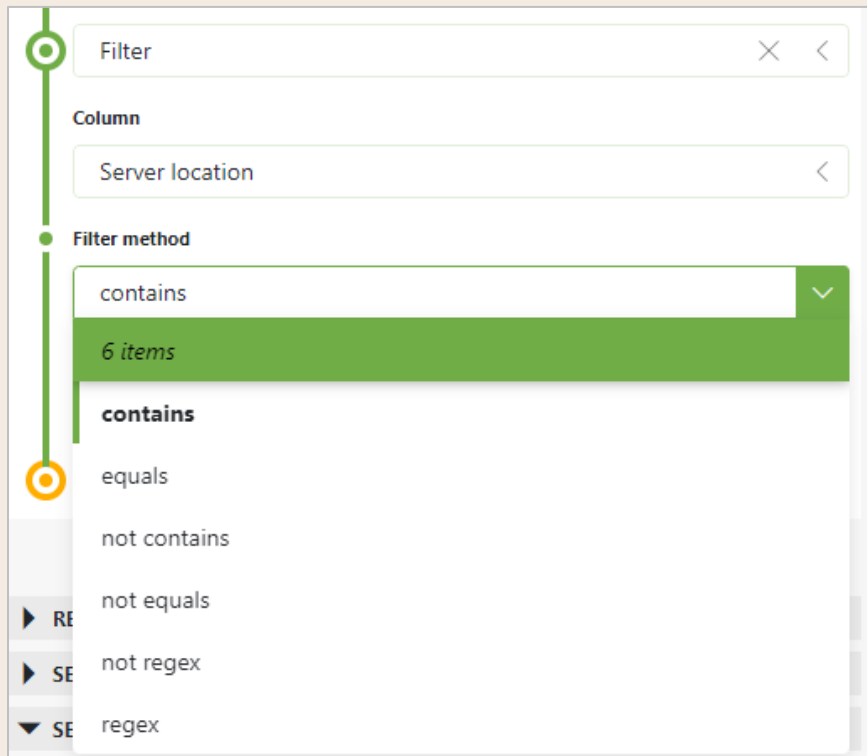
Chained operators that apply transformations to our data source



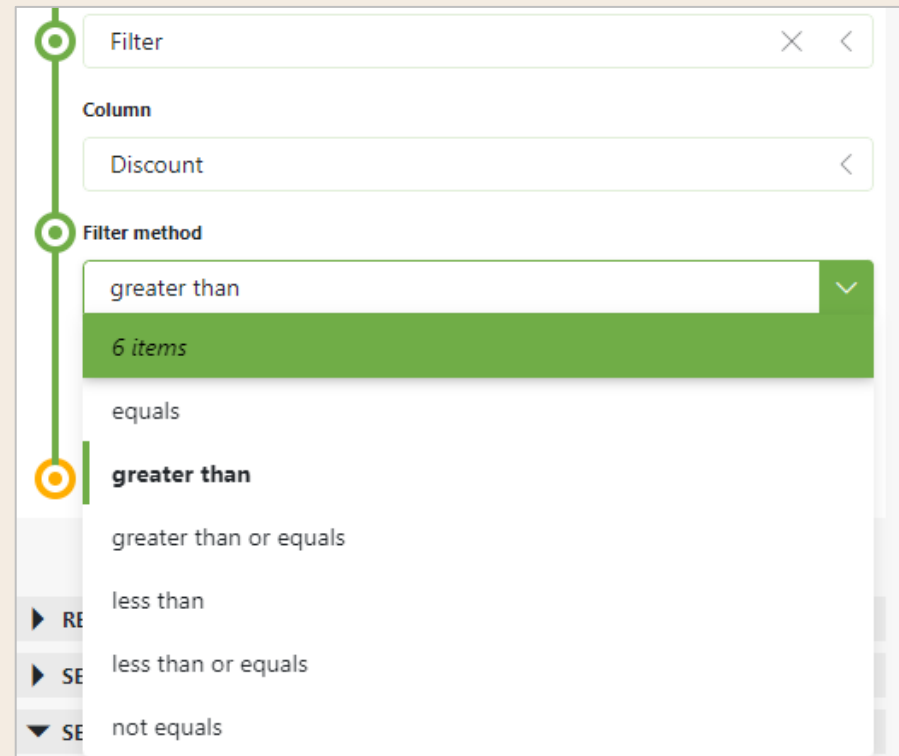
What are queries?

Conversational, my new best friend?

Looks at the current query and limits capabilities to what makes sense.



Text



Numeric



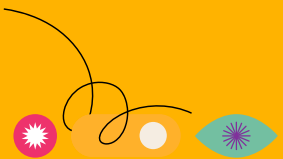
GET INSPIRED

Let's have  a look



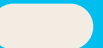
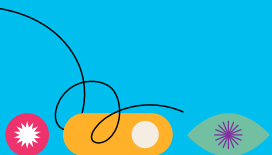
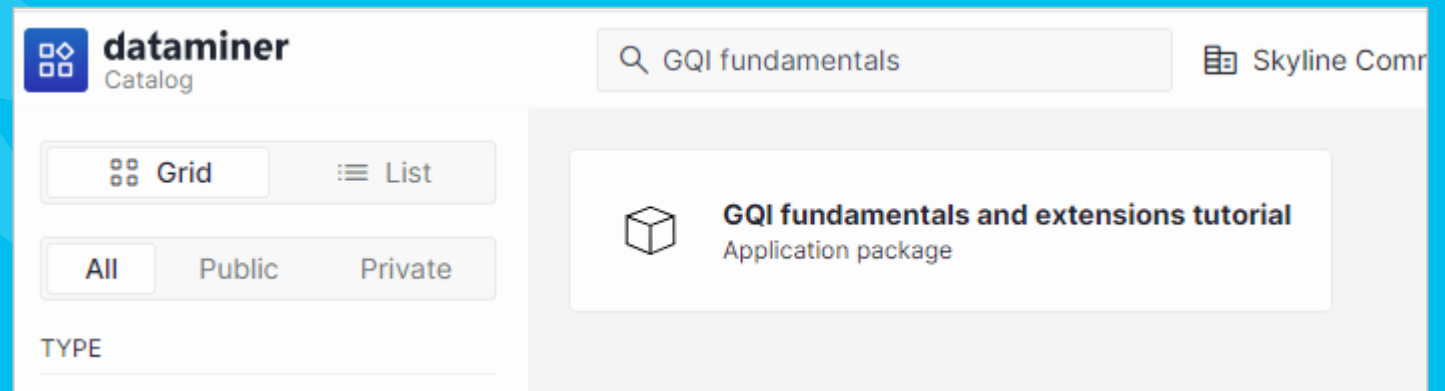
**We understand
the concept of
GQI and queries.**

GET INSPIRED



Hands-on time!

1. Go to 'catalog.dataminer.services'
2. Install the '**GQI fundamentals and extensions tutorial**' package



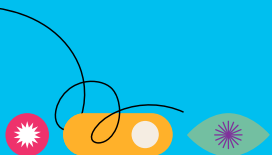
DASHBOARDS

- Empower
 - GQI
 - 1. Fundamentals
 - Exercises
 - 1. Selecting data
 - 2. Filter
 - 3a. Aggregate - I
 - 3b. Aggregate - II
 - 4. Sorting
 - 5. Top X
 - 6a. Column manipulation - I
 - 6b. Column manipulation - II
 - 7a. Joins - I
 - 7b. Joins - II
 - 8a. Advanced I
 - 8b. Advanced II
 - Solutions

Let's get our hands dirty!

Fundamentals exercises

We can use data sources and operators.



The data

ID	START	END	STATE	PACKAGE ID	CUSTOMER ID	SERVER LOCATION	LAST MINUTE	DISCOUNT
5f226aaa-bae9-456b-818f-dc4...	12-10-2024 02:00:00	20-10-2024 02:00:00	New	510e2e25-c131-4a53-b0e5-cc4a2...	4fed1c0a-445d-4d1f-92fe-06d25...	Europe		2%
01f2693a-1a71-4137-a439-f07...	27-4-2024 02:00:00	19-5-2024 02:00:00	Complete	47e23785-1fb4-4042-b800-adb8...	4fed1c0a-445d-4d1f-92fe-06d25...	China	✓	8%
	4-7-2024 02:00:00		Approved	47e23785-1fb4-4042-b800-adb8...	4fed1c0a-445d-4d1f-92fe-06d25...	US	✓	26%
	-12-2024 01:00:00		Approved	fa308d42-24e8-425e-bc3e-024ae...	4fed1c0a-445d-4d1f-92fe-06d25...	Australia	✓	14%

Get ad hoc data

Data source

Orders

ID	NAME	VERSION	PRICE PER HOUR (EURO)
510e2e25-c131-4a53-b0e5-cc4a213ec516	PrestigePro	1.0	30
fa308d42-24e8-425e-bc3e-024aeb464416	PrestigeLight	1.0	20
47e23785-1fb4-4042-b800-adb88e54c03b	PrestigeEnterprise		

Get ad hoc data

Data source

Packages

ID	NAME
4fed1c0a-445d-4d1f-92fe-06d25a04d5d9	Skyline Communications
d59cb576-3097-4411-93c1-99d3e1d34ed0	LAWO
de2217c1-df4c-46e7-b103-c60c9d77a174	Ziine

Get ad hoc data

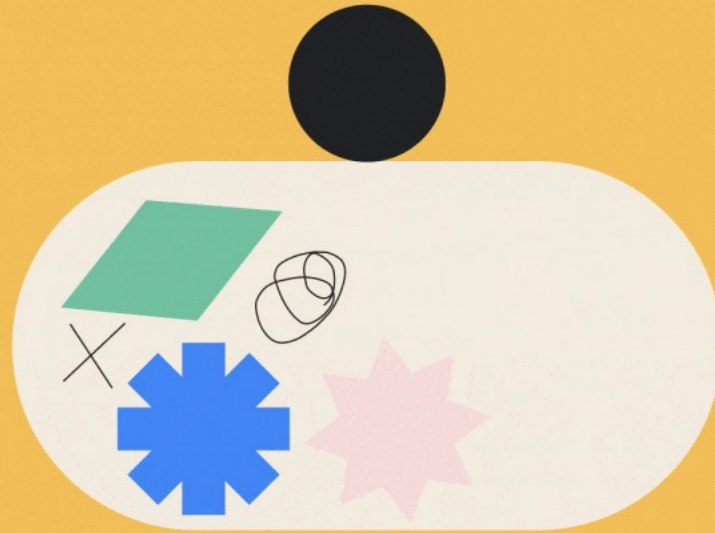
Data source

Organisations



SEE YOU IN 5 MINUTES

Break



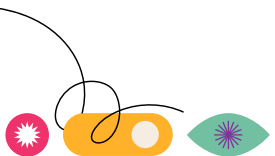
emp
wer!

GQL extensions

Why should we extend GQL?

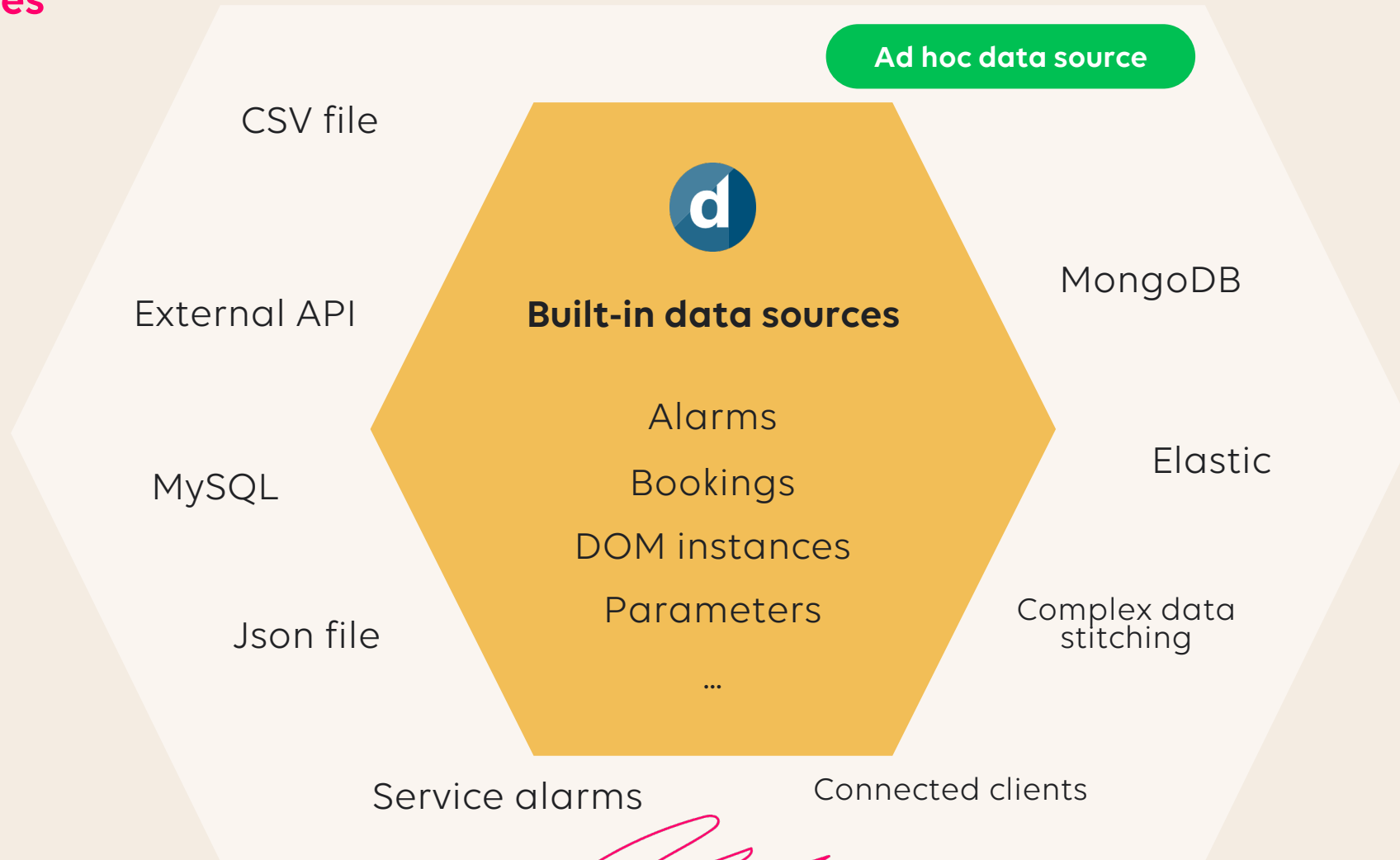
Ad hoc data source

Custom operator



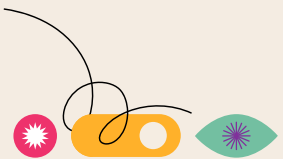
Why extend GQI?

Data sources



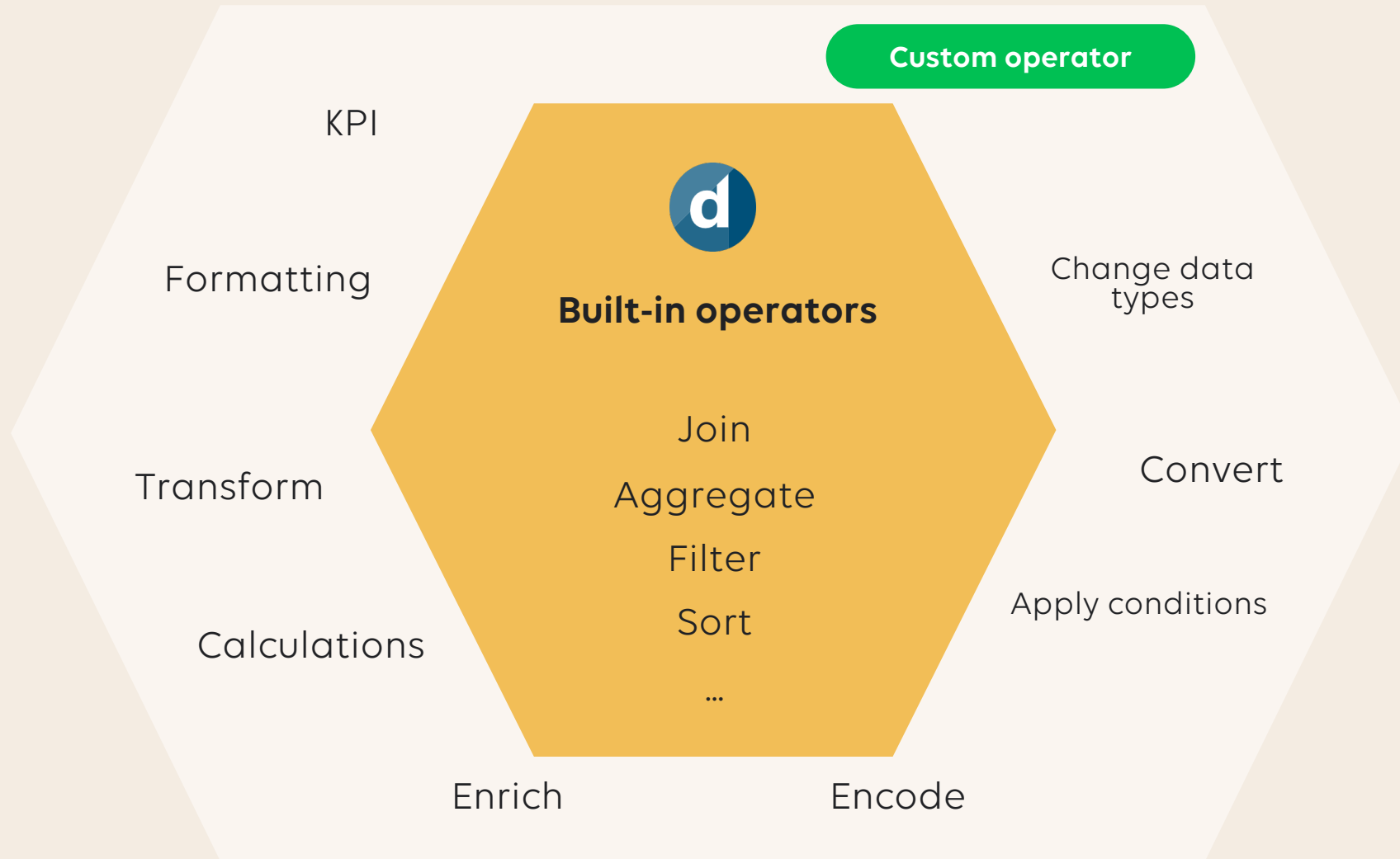
Data from the DMS

Understand why we sometimes need to extend GQI

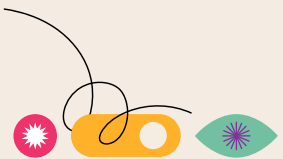


Why extend GQI?

Operators



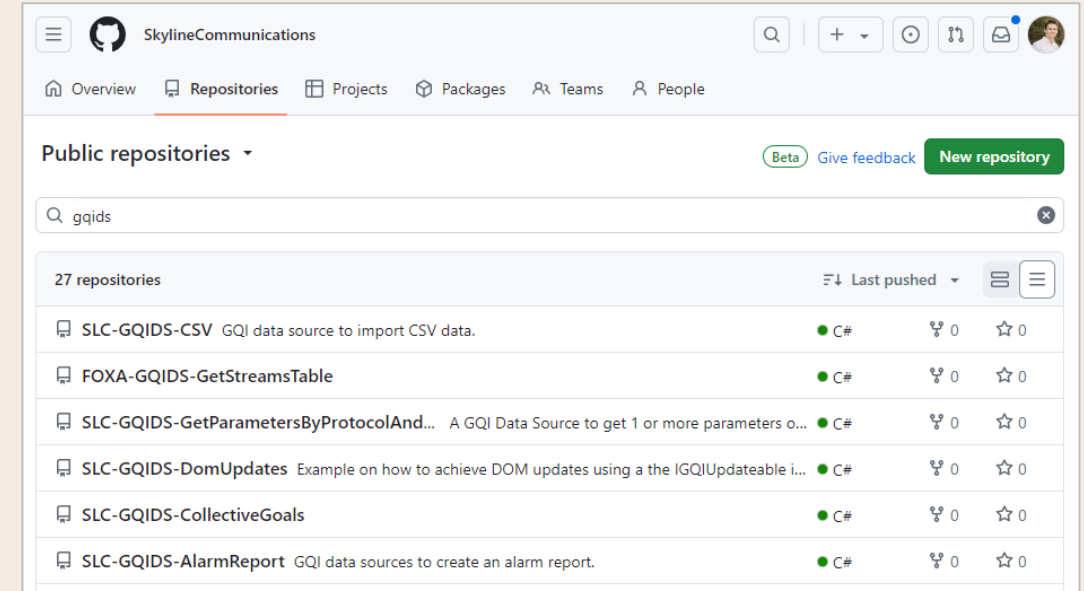
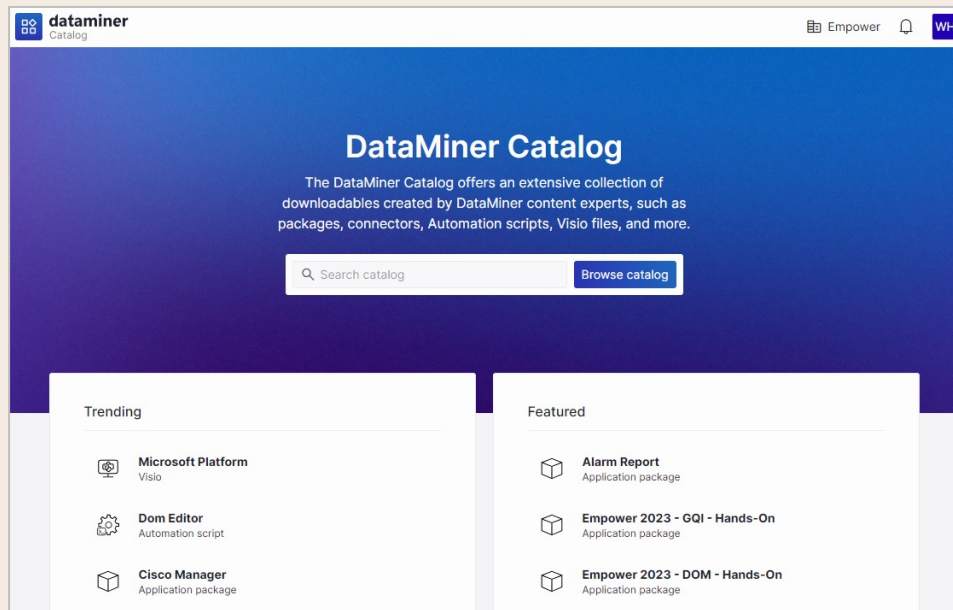
Understand why we sometimes need to extend GQI



But, how?

Reuse existing extensions

- Reuse existing code, leverage the **catalog**
- Create your own



Github as source control

catalog.dataminer.services



From CSV file to dashboard

Isn't it great?

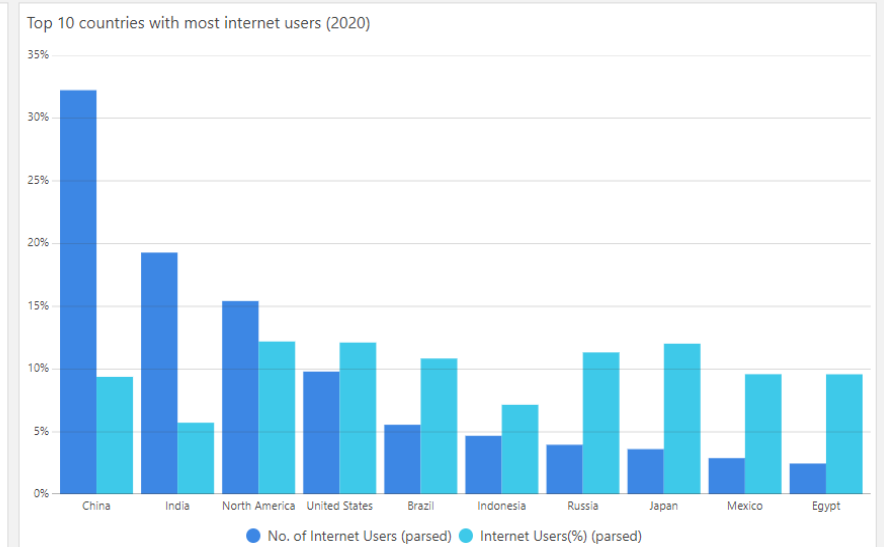
Index	Entity	Code	Year	Cellular Subscription	Internet Users(%)	No. of Internet Users	Broadband Subscription
0	Afghanistan	AFG	1980	0	0	0	0
1	Afghanistan	AFG	1981	0	0	0	0
2	Afghanistan	AFG	1982	0	0	0	0
3	Afghanistan	AFG	1983	0	0	0	0
4	Afghanistan	AFG	1984	0	0	0	0
5	Afghanistan	AFG	1985	0	0	0	0
6	Afghanistan	AFG	1986	0	0	0	0
7	Afghanistan	AFG	1987	0	0	0	0
8	Afghanistan	AFG	1988	0	0	0	0
9	Afghanistan	AFG	1989	0	0	0	0
10	Afghanistan	AFG	1990	0	0	0	0

Internet-users.csv

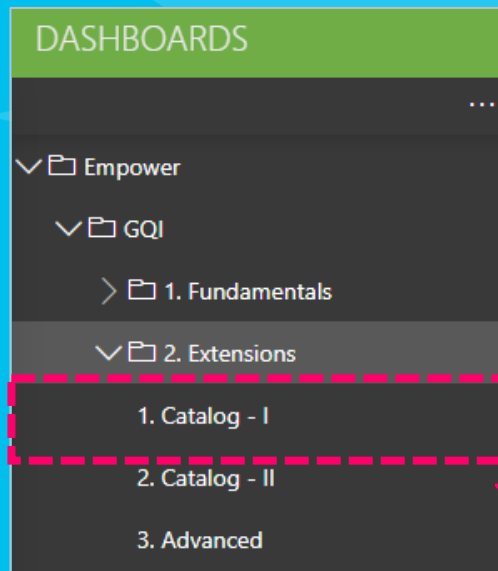
Dashboard

Internet users per country

INDEX	ENTITY	CODE	YEAR	CELLULAR SUBSCRIPTION	INTERNET USERS(%)	NO. OF INTERNET USERS	BROADBAND SUBSCRIPTION
0	Afghanistan	AFG	1980	0	0	0	0
1	Afghanistan	AFG	1981	0	0	0	0
2	Afghanistan	AFG	1982	0	0	0	0
3	Afghanistan	AFG	1983	0	0	0	0
4	Afghanistan	AFG	1984	0	0	0	0
5	Afghanistan	AFG	1985	0	0	0	0
6	Afghanistan	AFG	1986	0	0	0	0
7	Afghanistan	AFG	1987	0	0	0	0
8	Afghanistan	AFG	1988	0	0	0	0
9	Afghanistan	AFG	1989	0	0	0	0
10	Afghanistan	AFG	1990	0	0	0	0
11	Afghanistan	AFG	1991	0	0	0	0
12	Afghanistan	AFG	1992	0	0	0	0
13	Afghanistan	AFG	1993	0	0	0	0



Let's get our hands dirty!



Catalog - I

We can extend GQI by leveraging the Catalog

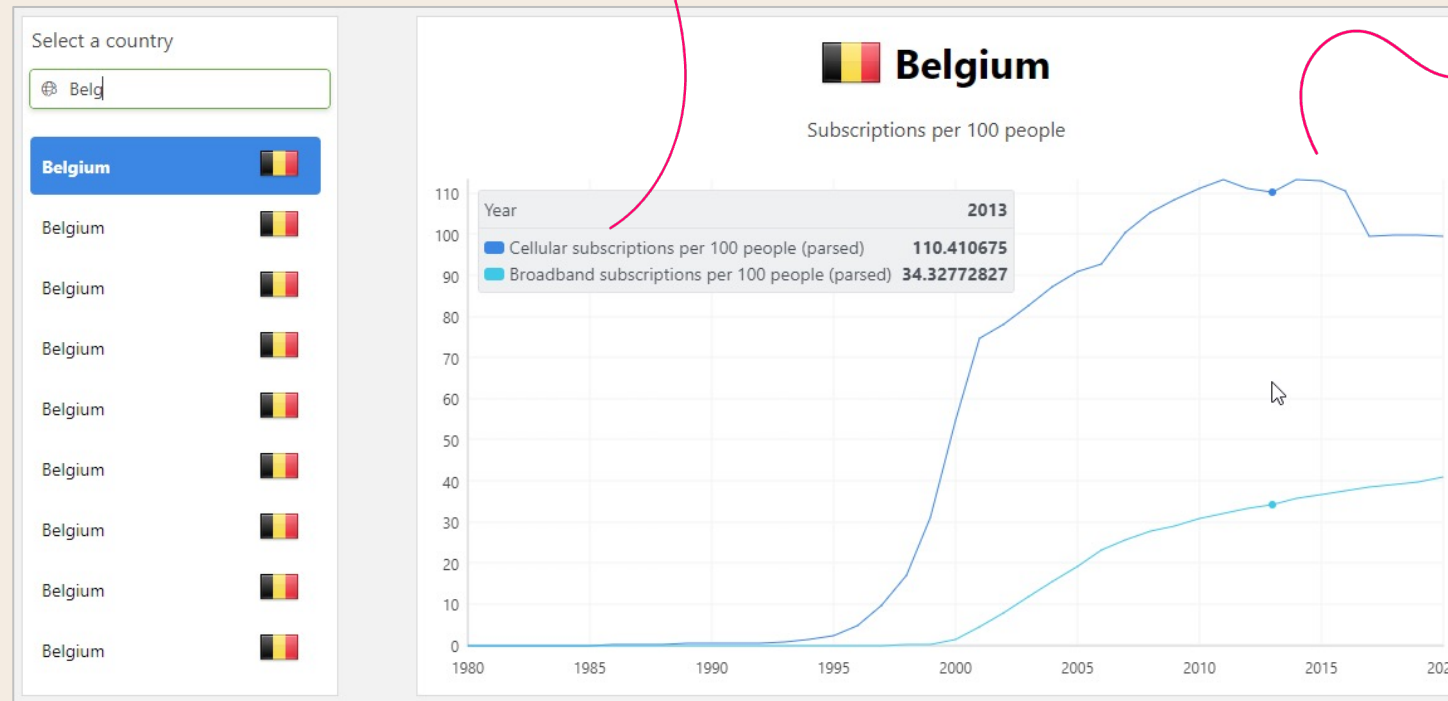
Let's improve an existing dashboard

Exercise

Improve labels

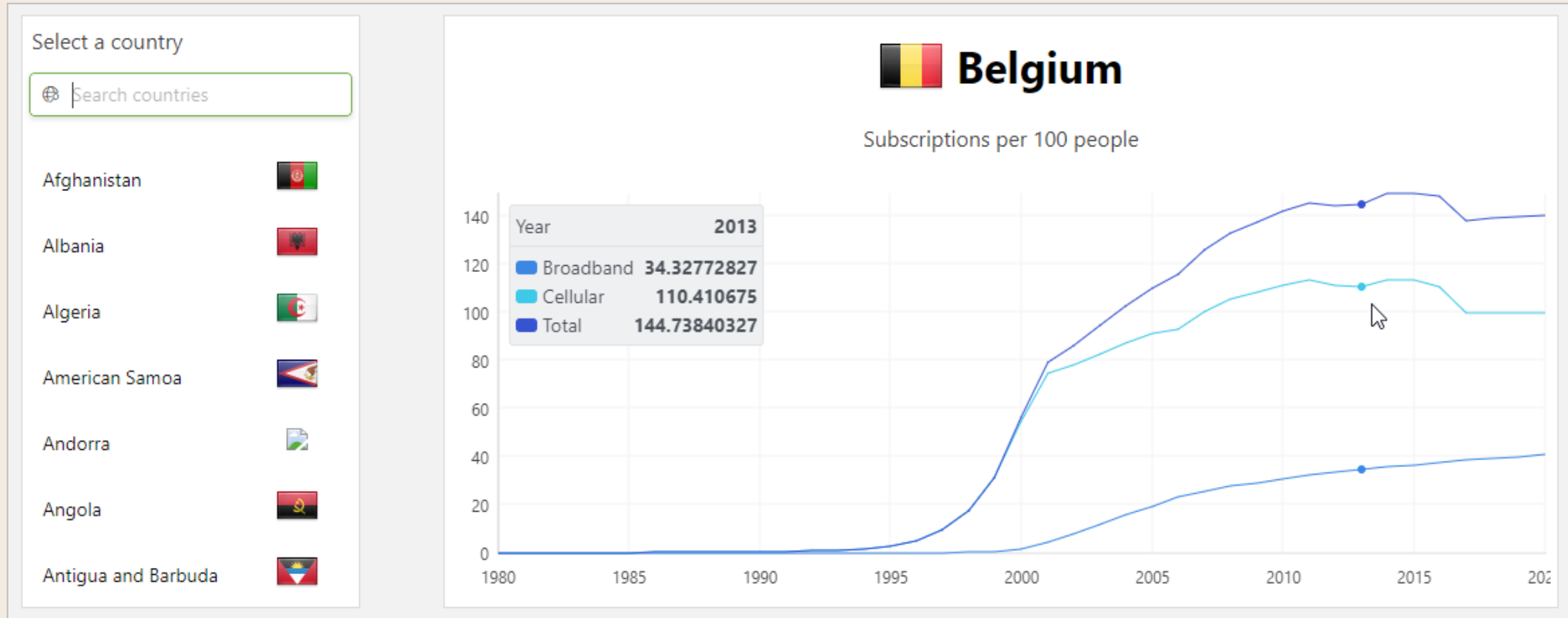
Add another line for total








Avoid duplicates



Let's improve an existing dashboard

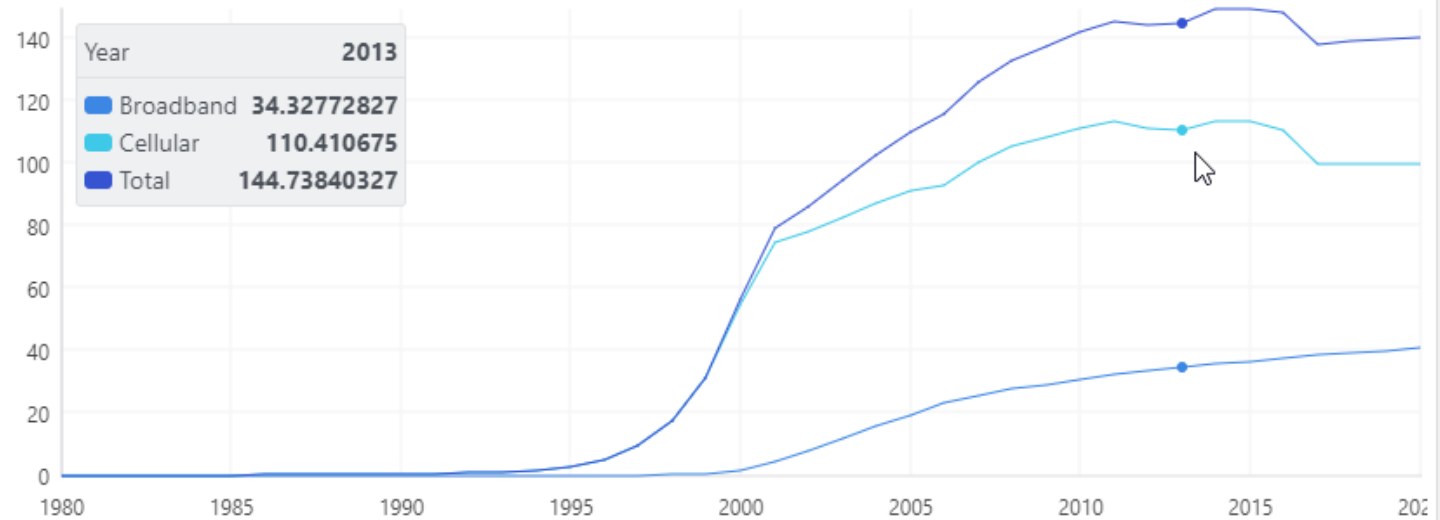
Result



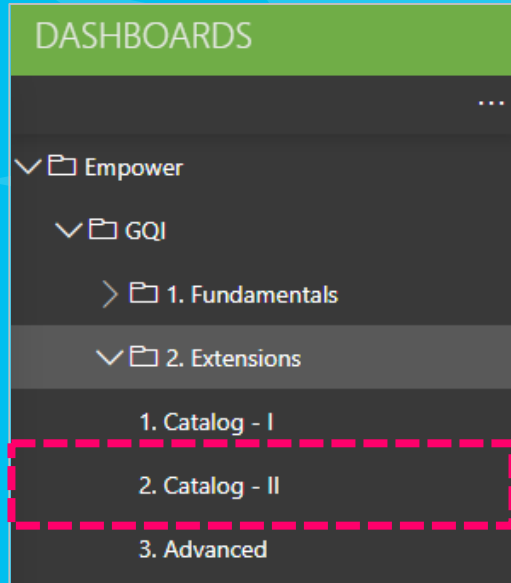
- Afghanistan 
- Albania 
- Algeria 
- American Samoa 
- Andorra 
- Angola 
- Antigua and Barbuda 

Belgium

Subscriptions per 100 people



Let's get our hands dirty!

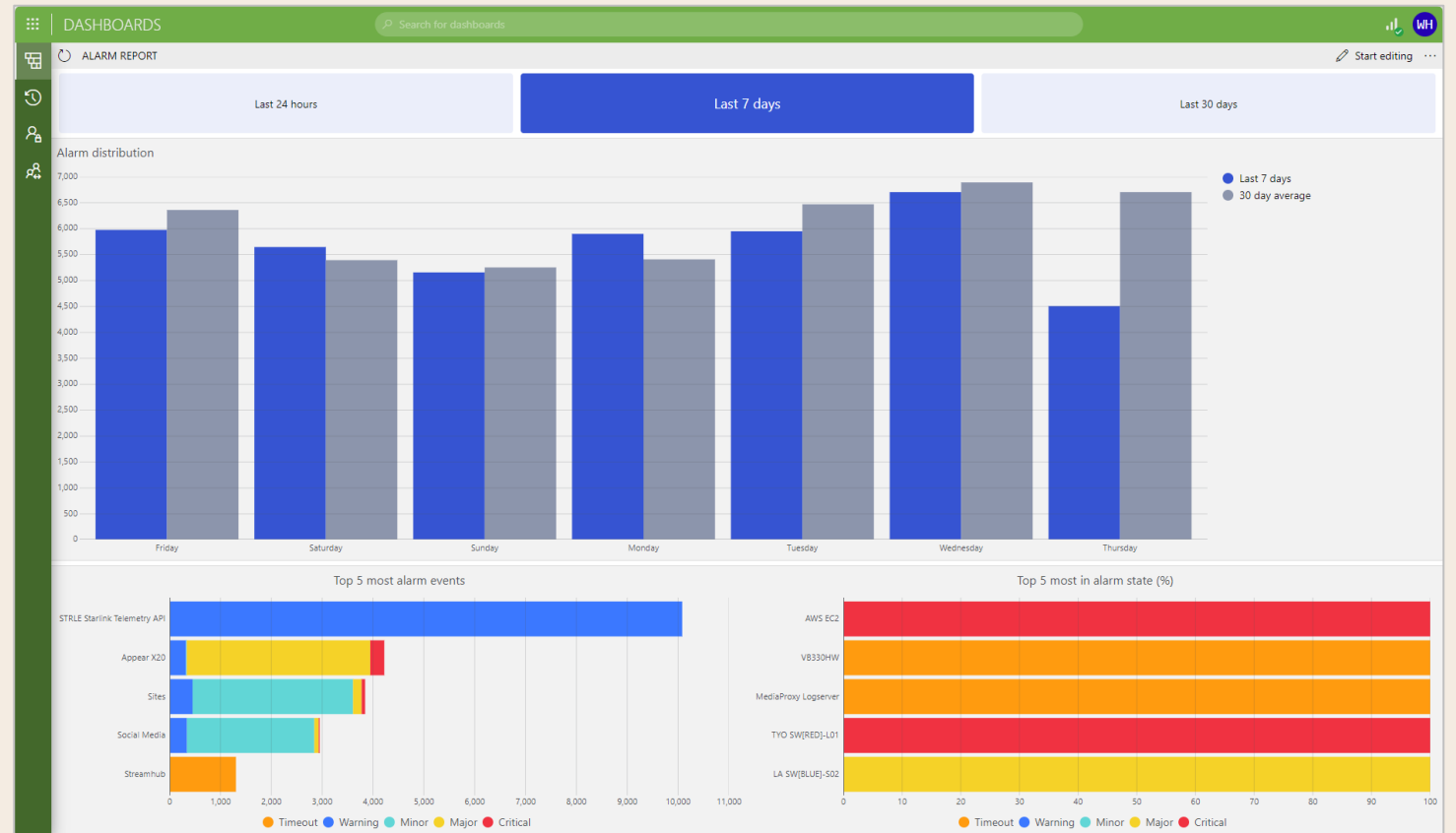
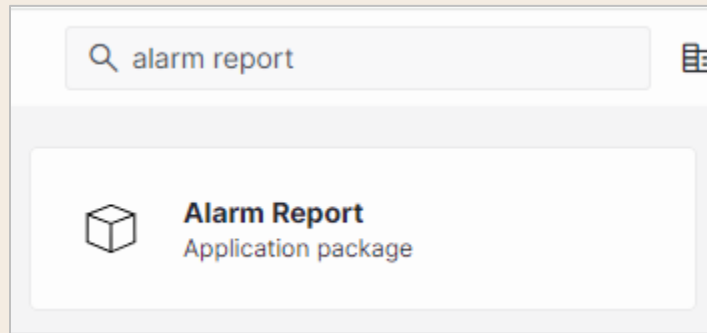


Catalog - II

We can extend GQI by leveraging the Catalog

Alarm report

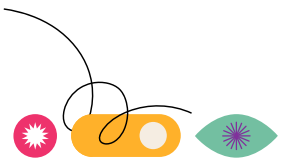
Available from the catalog



Creating our own extensions

Advanced

Exploring the possibilities



Extending GQI

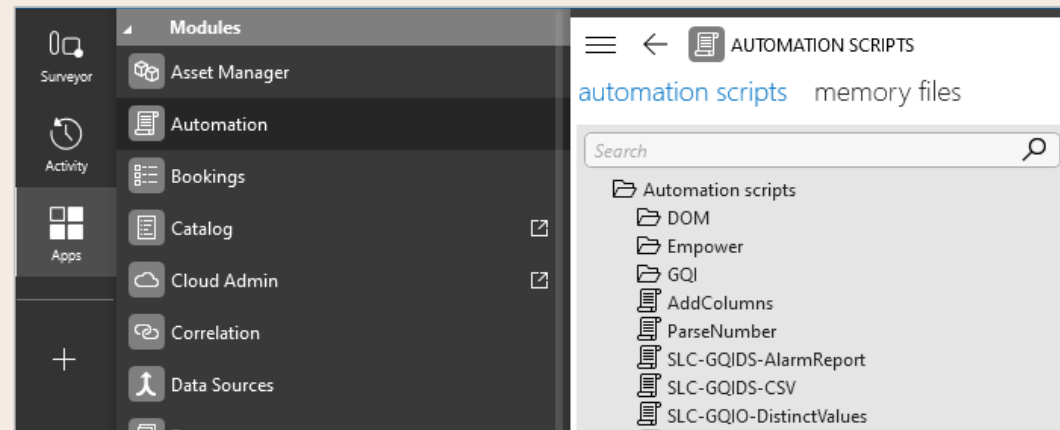
How does that work?

Advanced

Ad hoc data source

Custom operator

- C# Code
- Compiled as library (DLL) through Automation script module
 - Source code visible in Cube



The ad hoc data source

Advanced

Expose ANY data from any place, just in time



Ad hoc data source

Why should I care?

Include extra data not managed by DataMiner:

- Files (JSON, CSV, etc.)
- External database
- Web APIs
- ...

But also:

- Accessing DataMiner data when there is no built-in data source
- Full control over cache behavior, managing updates, ...



Ad hoc data source

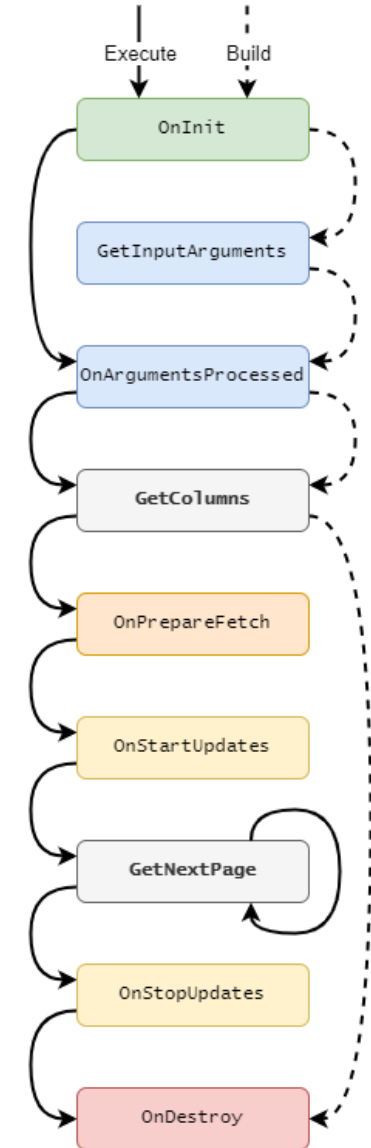
The lifecycle

1 Ad hoc data source = 1 C# class

Implement interfaces to add functionality

- **IGQIDataSource** Required
 - Define rows and columns
- **IGQIOnInit**
 - Initialization and access to services
- **IGQIInputArguments**
 - Define and receive external inputs
- And more...
 - Prefetch actions, publishing updates, resource clean up

Advanced



GET INSPIRED

Let's have



a look

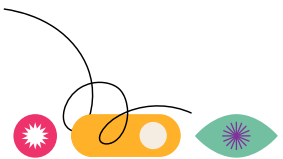


GET INSPIRED

The custom operator

Advanced

Massage the data in my own special way



The custom operator

Do I need this?

- When the basic built-in operators are not enough
 - Pack complex operations
 - Create specialized operations

But also:

- You have full control (C#)



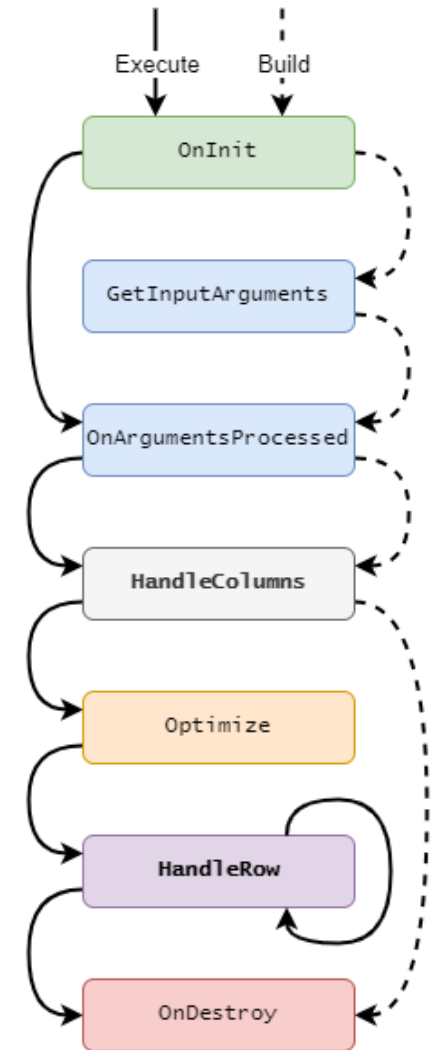
The custom operator

How does it work?

1 custom operator = 1 C# class

Implement interfaces to add functionality

- **IGQIColumnOperator** Required *
 - Add, delete or modify columns
- **IGQIRowOperator** Required *
 - Read cell values, modify cells values or delete rows
- **IGQIInputArguments**
 - Define and receive external inputs
- And more



GET INSPIRED

Let's have

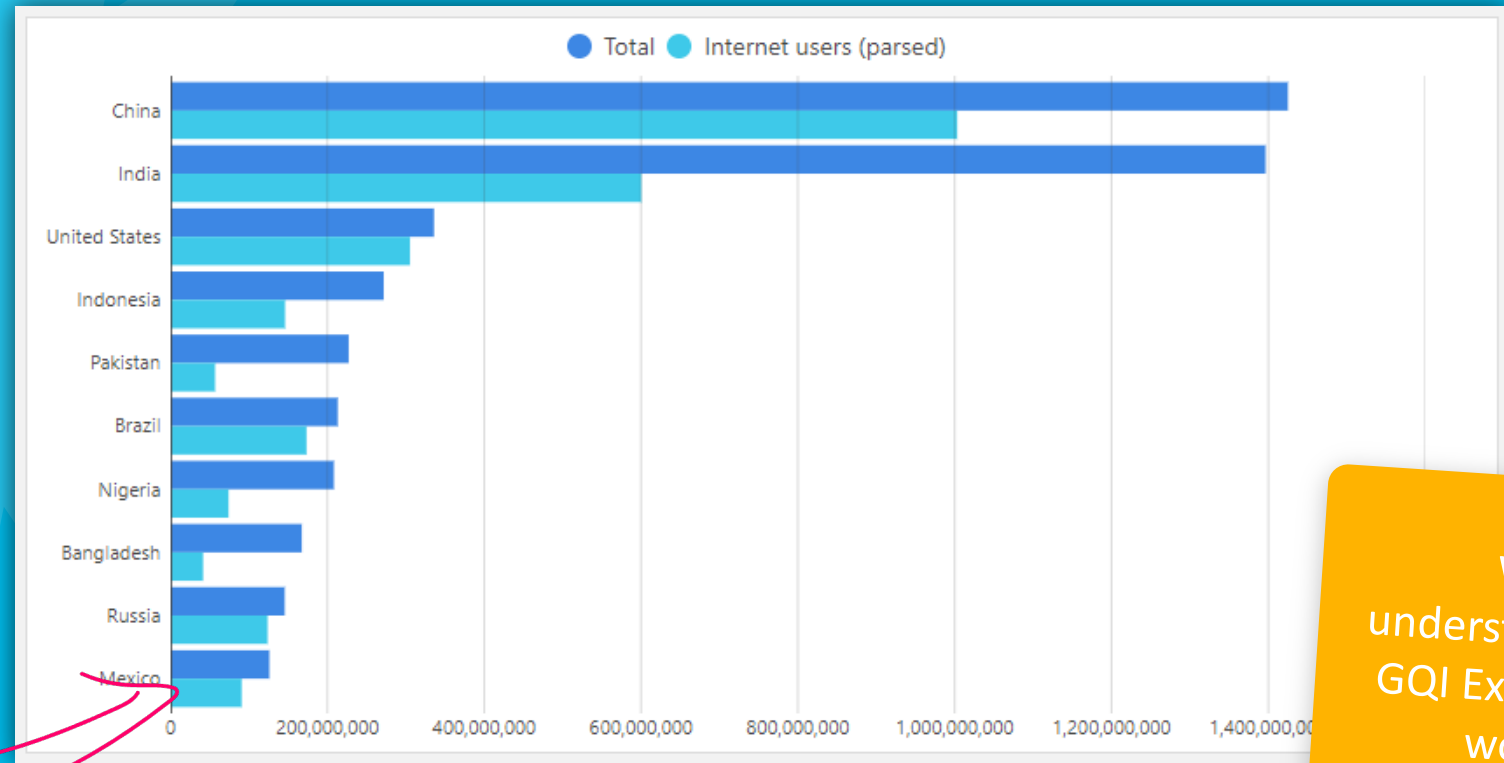
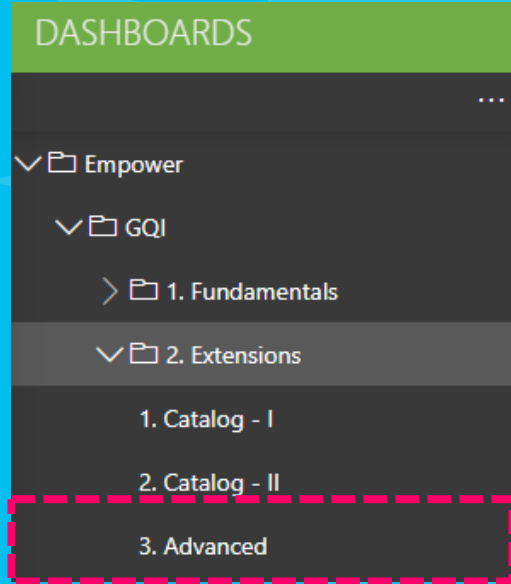


a look



GET INSPIRED

Let's get our hands dirty!

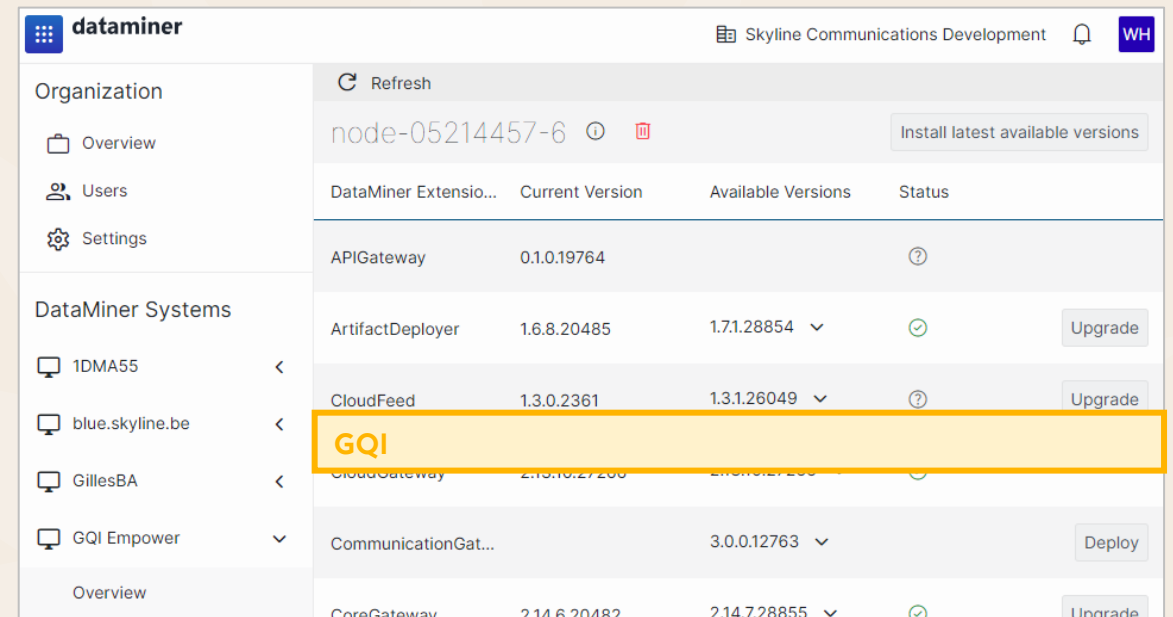


We understand how GQI Extensions work.

The future of GQI

What's coming up

- GQI as DataMiner Extension Module (DxM)
 - Own release track
 - Independently upgradeable
- Further enhance performance
 - Operators (Join)
 - Data sources (Caching)
- New features for extensions



The screenshot shows the DataMiner administration interface. The left sidebar contains navigation options: Organization (Overview, Users, Settings), DataMiner Systems (1DMA55, blue.skyline.be, GillesBA, GQI Empower), and Overview. The main content area displays a table of extension modules. The 'GQI' row is highlighted in yellow.

DataMiner Extensio...	Current Version	Available Versions	Status	
APIGateway	0.1.0.19764		?	
ArtifactDeployer	1.6.8.20485	1.7.1.28854	✓	Upgrade
CloudFeed	1.3.0.2361	1.3.1.26049	?	Upgrade
GQI				
CloudGateway	2.1.0.10.27.200	2.1.0.10.27.200	✓	
CommunicationGat...		3.0.0.12763		Deploy
CoreGateway	2.14.6.20482	2.14.7.28855	✓	Upgrade

admin.dataminer.services



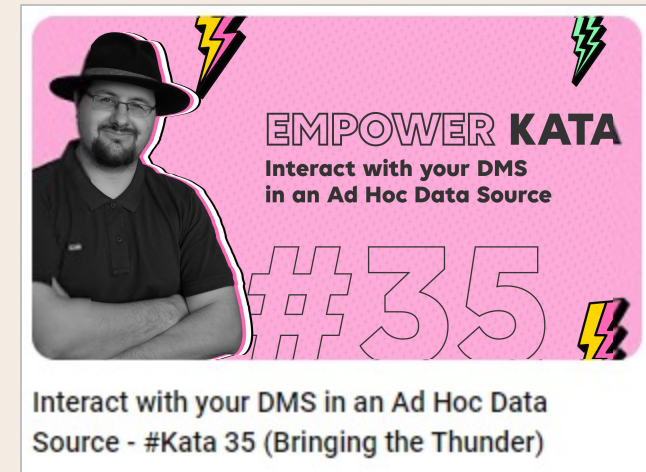
The learning journey continues

There is more



Build your own ad hoc data source or custom operator from scratch

COMING SOON



Interact with the DMS in an ad hoc data source



ASK AWAY

Questions?



NEXT UP

CHOOSE YOUR TOPIC OF INTEREST

Dataminer.MediaOps - Live

Engage in a live demonstration of dataminer.MediaOps in action within a real SMPTE ST 2110 environment. Explore the virtual signal group concept and create your own. Participate in crafting a personalized media workflow and gain insights into the details of the new Flow Engineering (SDN) function. Create your own personalized control surface and run your workflow on your DaaS system. Learn how the workflow is executed and monitored.

LOCATION

Training room T1 & Skylounge T2 +11

Hardening your DMS

Join the DataMiner Hardening Empower session to go beyond the out-of-the-box configuration and master key strategies for taking full control of your DataMiner system to maximize its security.

LOCATION

Creative hub T2 +9



Deploy

your own—Live connection
management system
with MediaOps

YOUR HOST



Reinout Daels

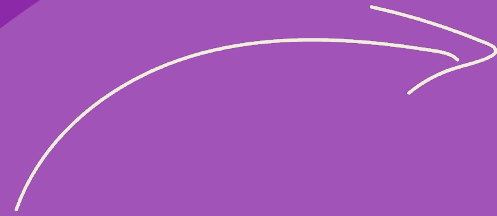


PRODUCT MARKETING MANAGER



REINOUT.DAELS@SKYLINE.BE

YOUR HOST



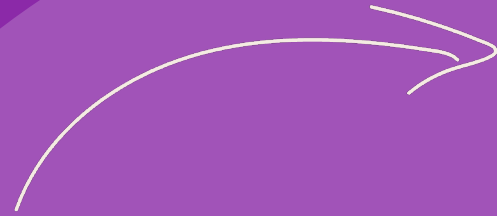
Michiel Saelen

PRINCIPAL SOLUTION ARCHITECT



MICHEL.SAELEN@SKYLINE.BE

YOUR HOST



Joey
Vanhalst

ENGINEERING MANAGER

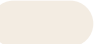
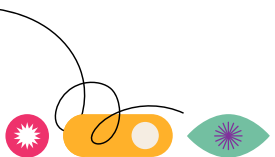


JOEY.VANHALST@SKYLINE.BE

Agenda

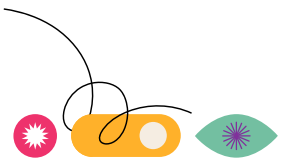


- Demo of Skyline lab
- Getting hands-on
 - Control surface: set up connections
 - Flow monitoring: track flows through the network
- Deep dive:
 - Virtual Signal Groups: create your own (IP) source & connect it
 - Workflow designer: build and run your own workflow
- Exercise: customize the out-of-the-box control surface



dataminer.MediaOps Live

Demo

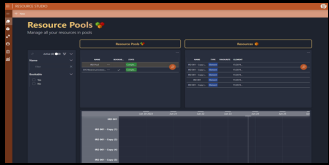


dataminer.MediaOps

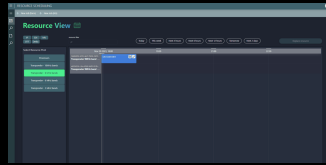
Digital operations : data driven, simplified and automated operations



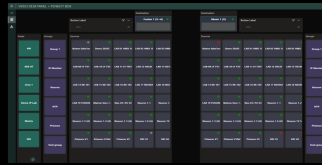
Example applications:



RESOURCE STUDIO



SCHEDULING



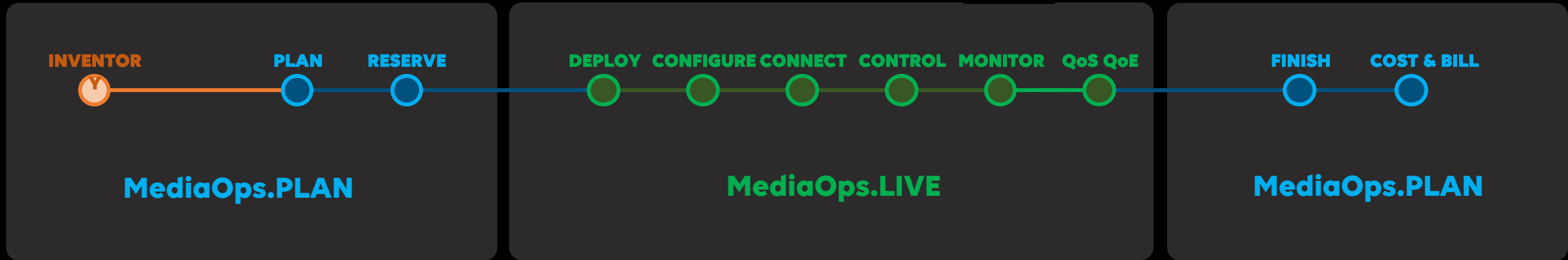
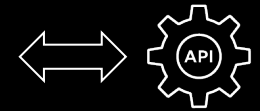
CONTROL SURFACE



MONITOR



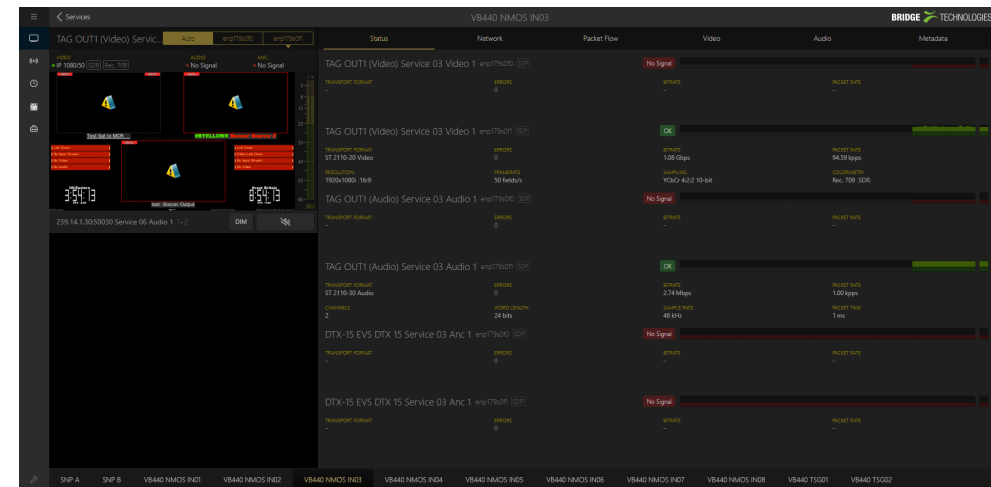
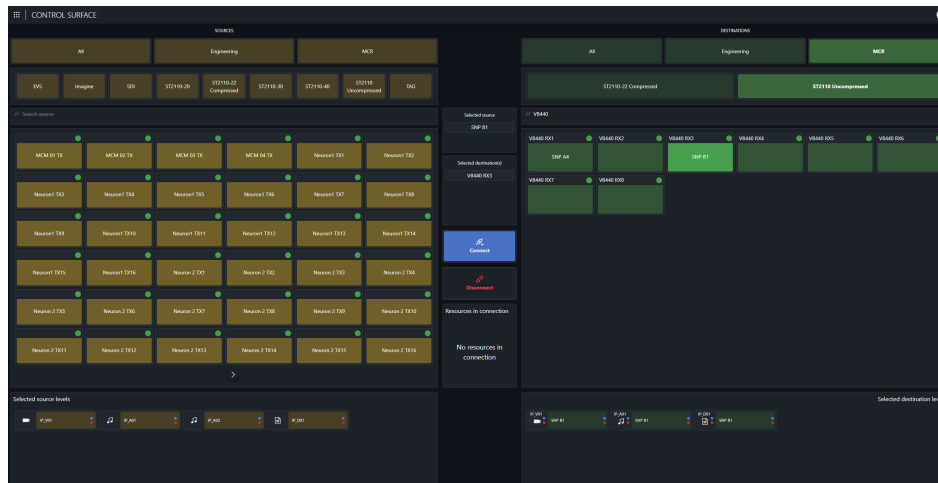
COSTING & BILLING



MediaOps Live – Demo System

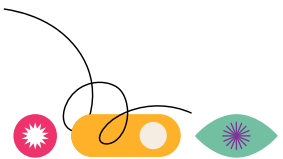
Skyline lab environment to test and demo MediaOps use cases

- Multi-vendor & Multi-domain (SDI, MPEG-TS, ST2110, SRT)
- Use cases
 - NMOS IS-04 device onboarding
 - ST2110 ad-hoc signal switching (via NMOS IS-05)
 - Flow Monitoring
 - PTP Monitoring
 - Tech Partner APPs (Bridgetech, TAG)



dataminer.MediaOps Live

Getting hands-on with the apps

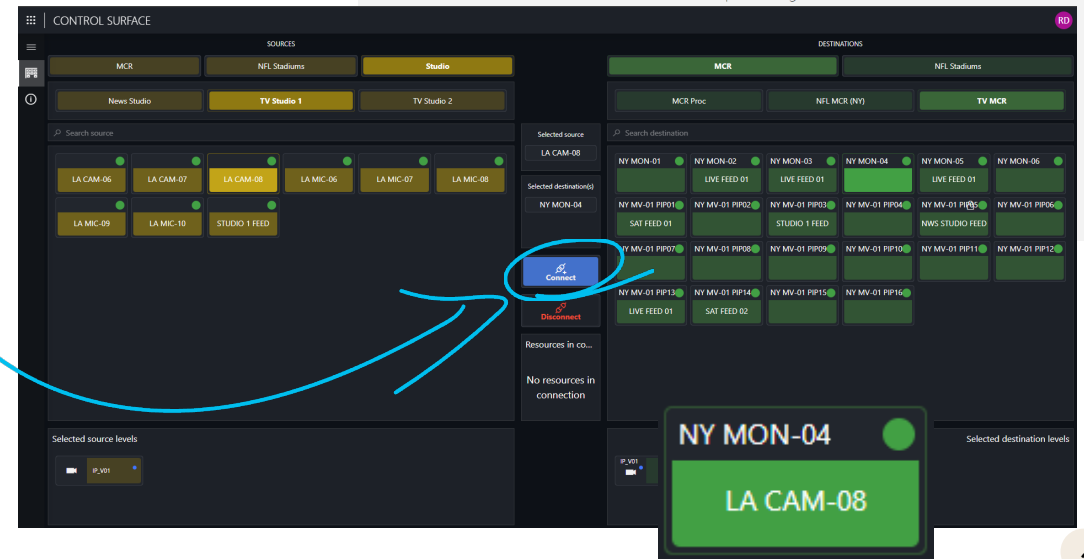
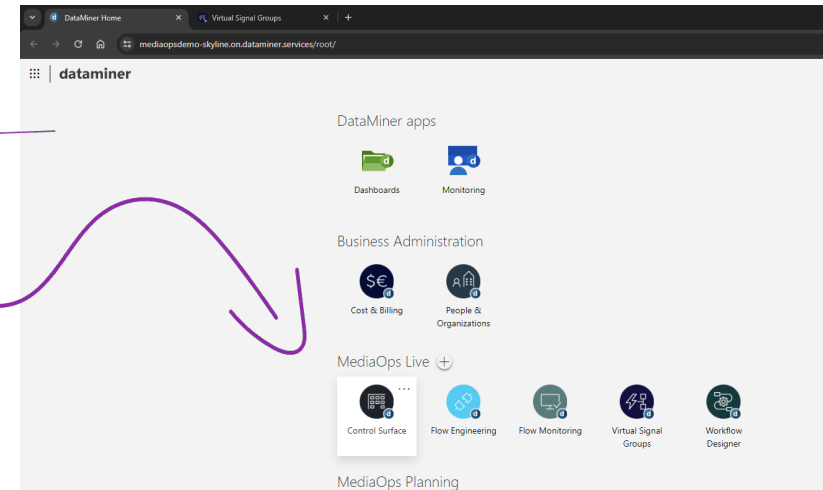


Control Surface

Connecting a source to a destination

exercise

- From the home page of your system, open the Control Surface app
- Under sources, select:
 - 'Studio'
 - Choose one of the three studios (News Studio, TV Studio 1, TV Studio 2)
 - One of the camera's in the studio (LA CAM-XX)
- Under destinations, select:
 - 'MCR'
 - 'TV MCR'
 - One of the monitors in the MCR (NY MON-XX)
- Click the 'Connect' button in the middle of the panel

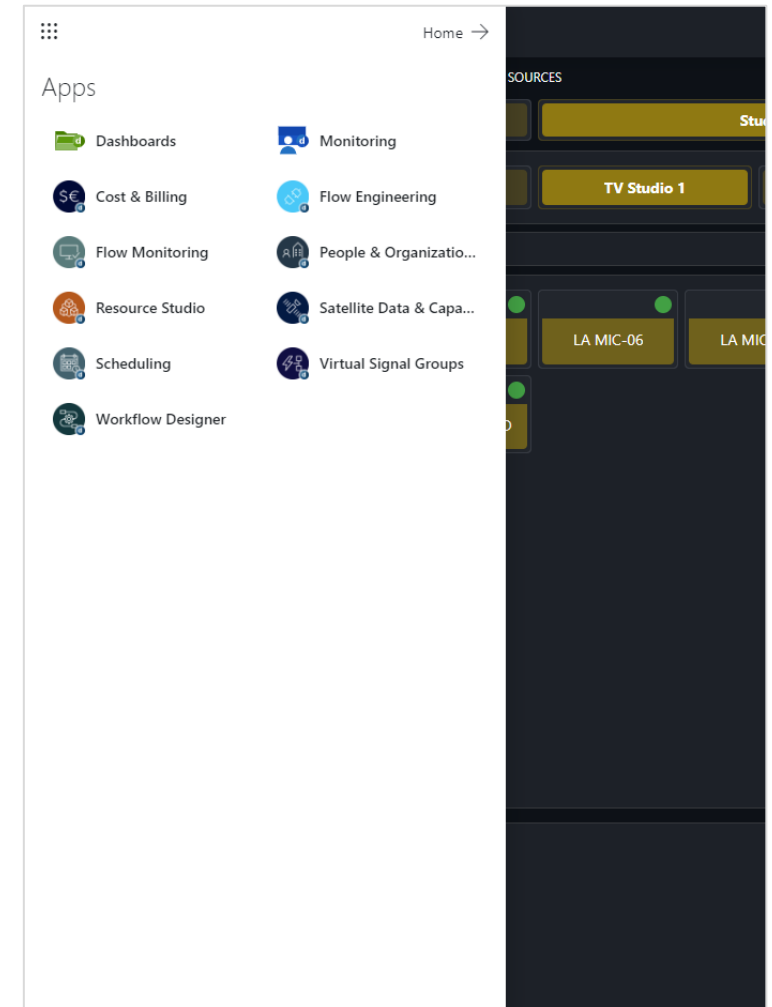
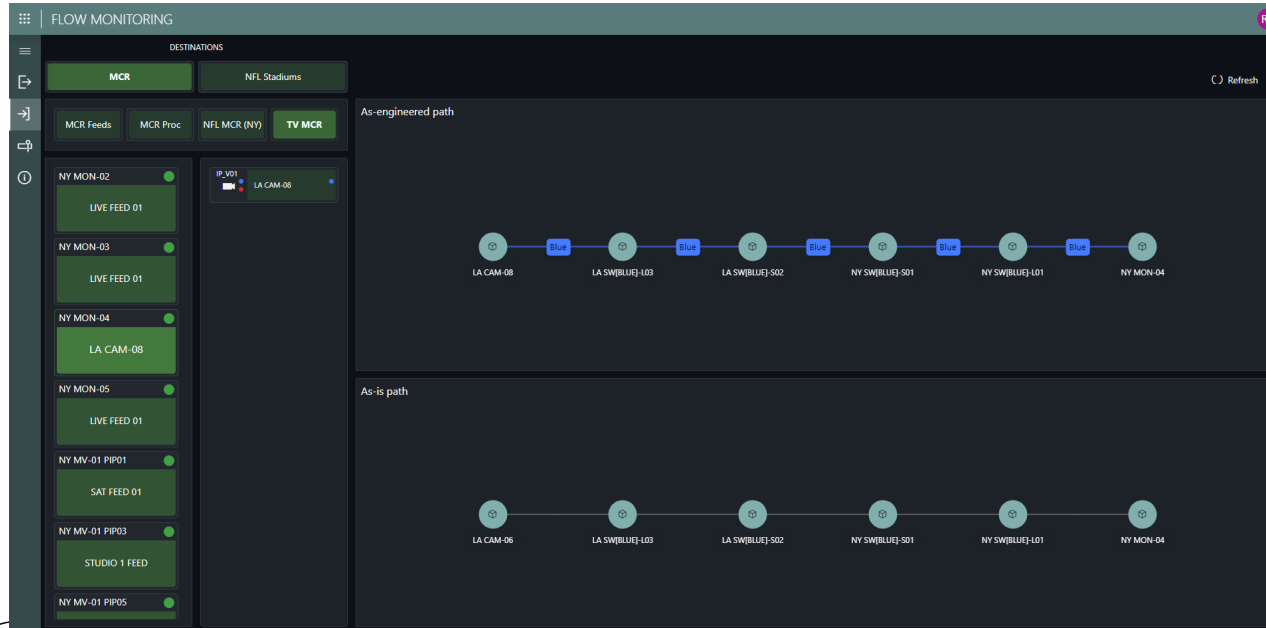


Flow Monitoring

Tracking the path of the flow

exercise

- Click the 'waffle' icon in the top left corner of the screen and open the Flow Monitoring app
- Find & select the source you just used to connect to (LA CAM-XX)
- Inspect the as-engineered & as-is paths of the flow you just set up



Try different connections

exercise

- Select 'Studio Feed' source
- Connect it to one of the multiviewer destinations (NY MV-01 PIPXX)
- Inspect the result in the Flow Monitoring application

- Change selection under sources from 'Studio' to 'MCR' > 'MCR Feeds'
- Select one of the SDI sources
- Connect it to one of the multiviewer destinations
- Inspect the result in the Ops Board in the Scheduling application



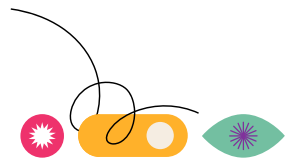
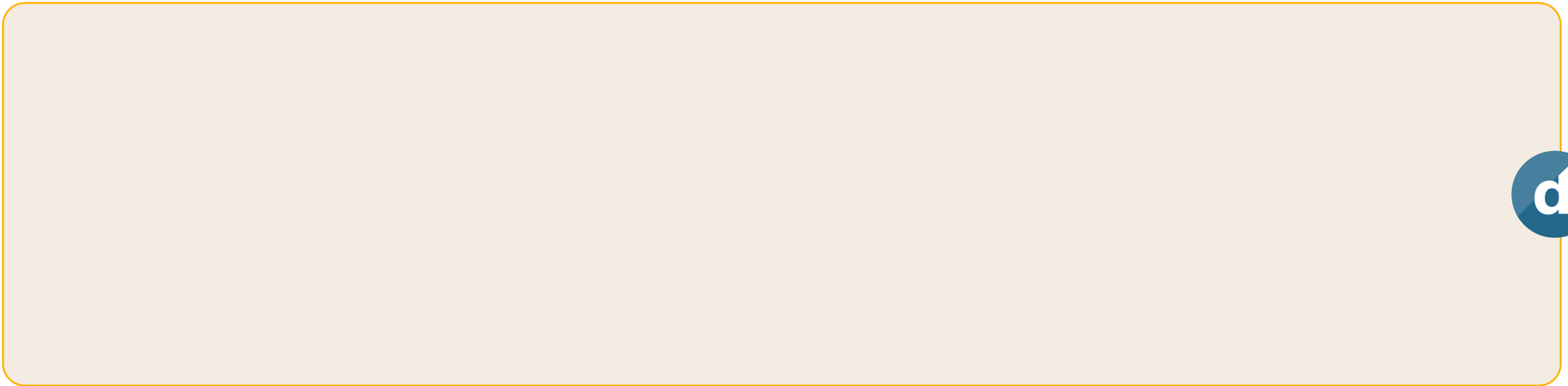
Deep dive

Build up together how the system works in the background

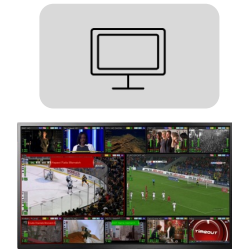
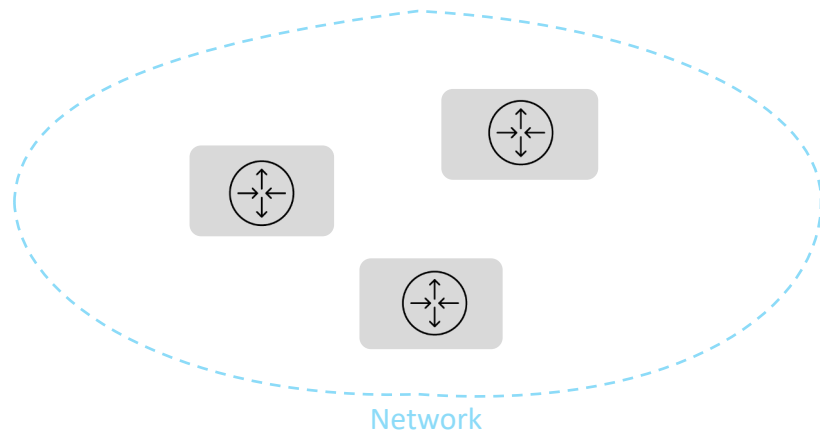
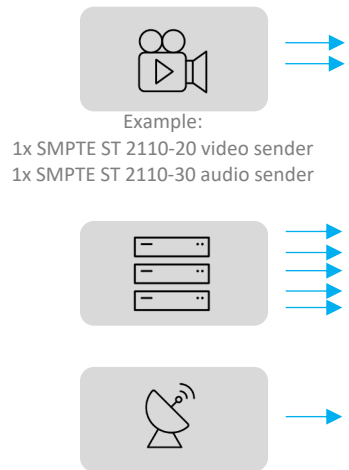


DataMiner MediaOps LIVE

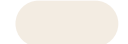
High-level picture



Sources

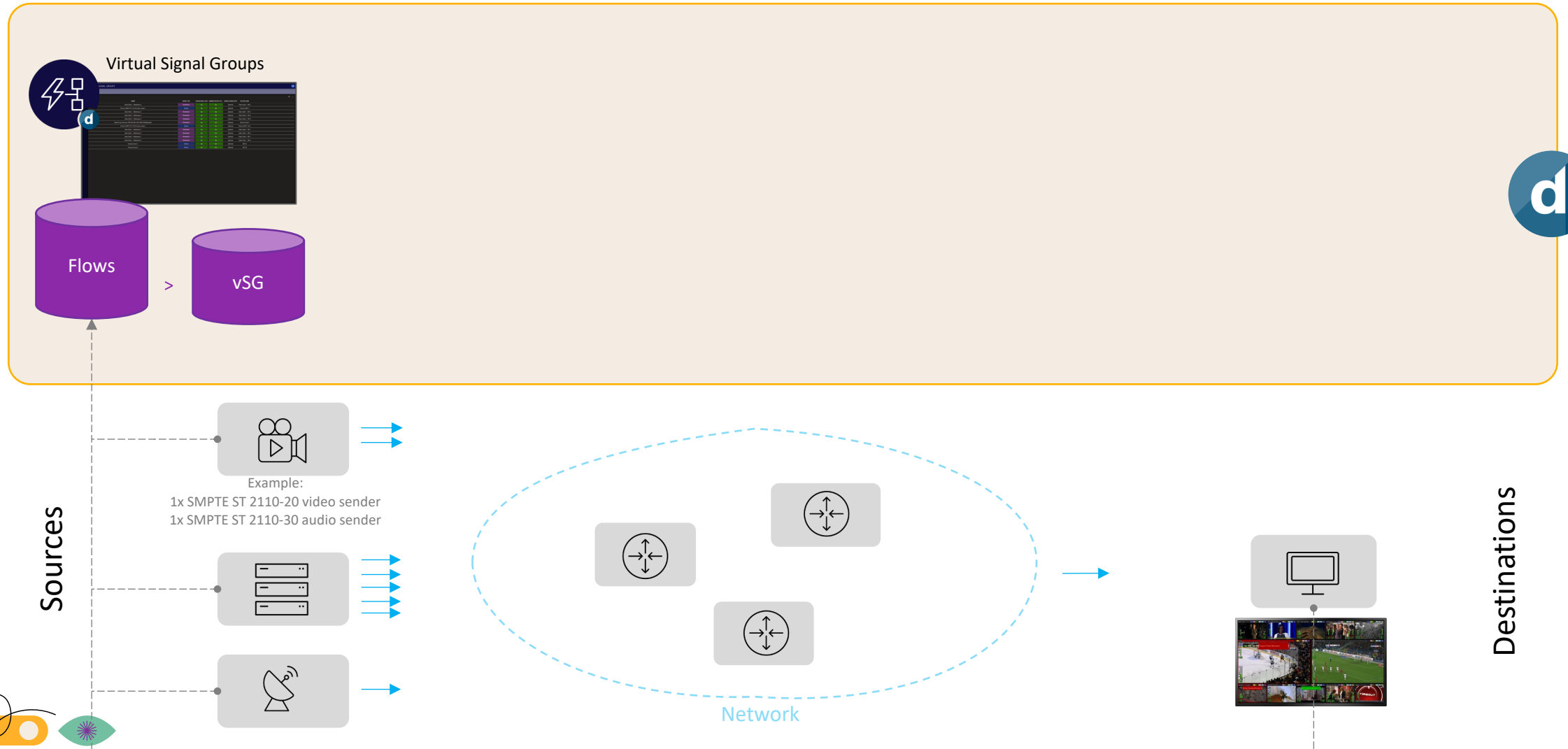


Destinations



DataMiner MediaOps LIVE

High-level picture



Flows

Open database of flow senders & flow receivers

- Flows are elementary streams of video, audio and/or data
- Supports multiple network technologies :
 - IP (2110-20, 2110-30, 2022-6...)
 - SDI, ASI, L-Band, SDH, ...
 - MPLS, pseudowire, VLAN, .. *
 - Internet transport RIST, Zixi, ... *
- Data model distinguishes flow senders & flow receivers
- Common fields that situate the sender or receiver in the network that are used for path calculation & documentation
- Technology-specific fields used to effectively set up the flow in the network (e.g. IP transport parameters)
- User-definable labels can be attached, specific to the application
- Can be assigned to a vSG level (red or blue)
- Belongs to one or multiple vSG

Save Delete

Neuron primary video stream

Flow Info

Name

Transport Type

Operational State

Administrative State

Flow Transport (IP)

Source IP

Destination IP

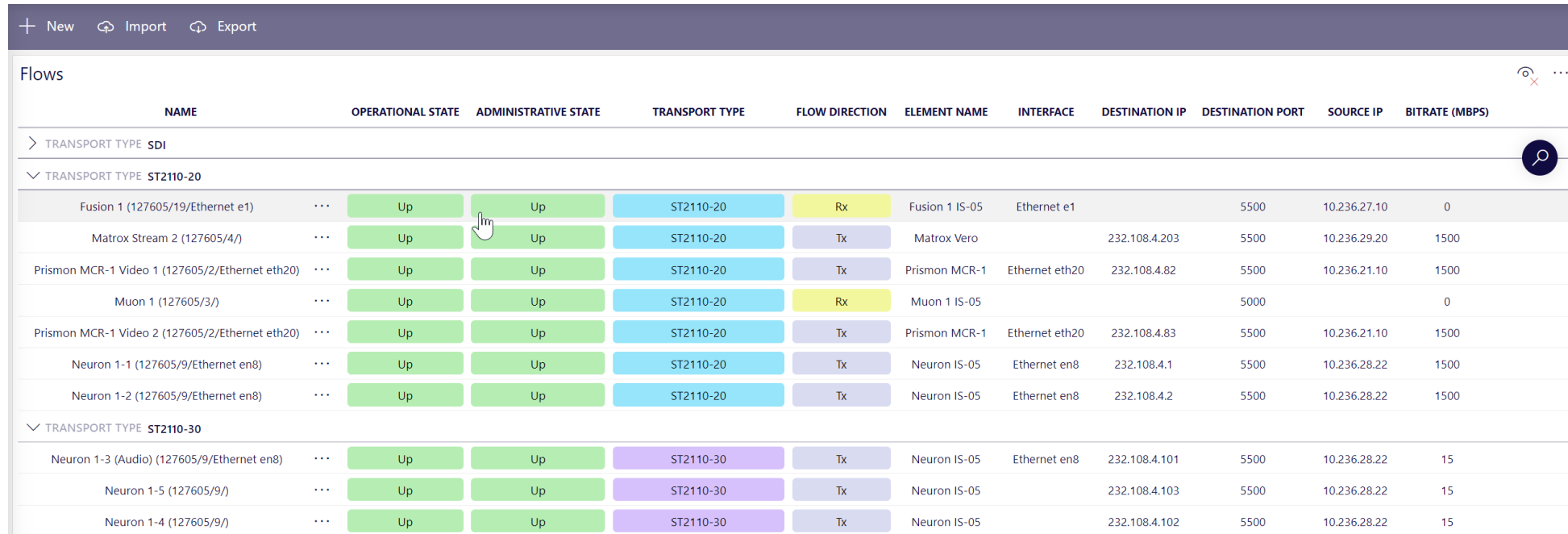
Destination Port

Bitrate (Mbps)

COS

Flows

Open database of flow senders & flow receivers



NAME	OPERATIONAL STATE	ADMINISTRATIVE STATE	TRANSPORT TYPE	FLOW DIRECTION	ELEMENT NAME	INTERFACE	DESTINATION IP	DESTINATION PORT	SOURCE IP	BITRATE (MBPS)
TRANSPORT TYPE SDI										
TRANSPORT TYPE ST2110-20										
Fusion 1 (127605/19/Ethernet e1)	Up	Up	ST2110-20	Rx	Fusion 1 IS-05	Ethernet e1		5500	10.236.27.10	0
Matrox Stream 2 (127605/4/)	Up	Up	ST2110-20	Tx	Matrox Vero		232.108.4.203	5500	10.236.29.20	1500
Prismon MCR-1 Video 1 (127605/2/Ethernet eth20)	Up	Up	ST2110-20	Tx	Prismon MCR-1	Ethernet eth20	232.108.4.82	5500	10.236.21.10	1500
Muon 1 (127605/3/)	Up	Up	ST2110-20	Rx	Muon 1 IS-05			5000		0
Prismon MCR-1 Video 2 (127605/2/Ethernet eth20)	Up	Up	ST2110-20	Tx	Prismon MCR-1	Ethernet eth20	232.108.4.83	5500	10.236.21.10	1500
Neuron 1-1 (127605/9/Ethernet en8)	Up	Up	ST2110-20	Tx	Neuron IS-05	Ethernet en8	232.108.4.1	5500	10.236.28.22	1500
Neuron 1-2 (127605/9/Ethernet en8)	Up	Up	ST2110-20	Tx	Neuron IS-05	Ethernet en8	232.108.4.2	5500	10.236.28.22	1500
TRANSPORT TYPE ST2110-30										
Neuron 1-3 (Audio) (127605/9/Ethernet en8)	Up	Up	ST2110-30	Tx	Neuron IS-05	Ethernet en8	232.108.4.101	5500	10.236.28.22	15
Neuron 1-5 (127605/9/)	Up	Up	ST2110-30	Tx	Neuron IS-05		232.108.4.103	5500	10.236.28.22	15
Neuron 1-4 (127605/9/)	Up	Up	ST2110-30	Tx	Neuron IS-05		232.108.4.102	5500	10.236.28.22	15

- Creation of **flow senders** ("Tx") and **flow receivers** ("Rx")
- These can be of **any transport technology**: IP, SDI, ASI, L-band*, ...
- Flow senders and flow receivers are **linked to an element and an interface** (optional for IP)
- For **IP flow senders extra parameters** required: IP address, destination IP address, IP port, ...

Save Delete

Neuron 9

Info

Name ⓘ
Neuron 9

Description ⓘ
Neuron 9

Role ⓘ
Source

Operational State ⓘ
Up

Administrative State ⓘ
Up

Type
IP In

System Labels

UMD Label ⓘ

Button Label ⓘ
Neuron 9

Virtual Signal Groups

Open database of sources & destinations

Groups multiple flow senders or receivers into one object, resulting in a single source or destination

Object that operators interact with day-to-day

Allows to easily **connect groups of flows** in one go

Senders/receivers in a single source/destination can come **from different elements in the network**

vsGroups can be **synced with external systems automatically**

- External controllers (Nevion, GV Orbit, EVS Cerebrum, NTP, IS-04, ...)
- External orchestrators (Media Services app, ...)
- Needs support by the API and corresponding Connector

vsGroups can be CRUD **dynamically by event schedules**

- e.g. Prepare desk and MV for expected lines following playlist
- e.g. Create sources based on upcoming bookings

vsGroups can be CRUD **from MediaOps Resource Studio app**

Virtual Signal Groups

Turning flows into content

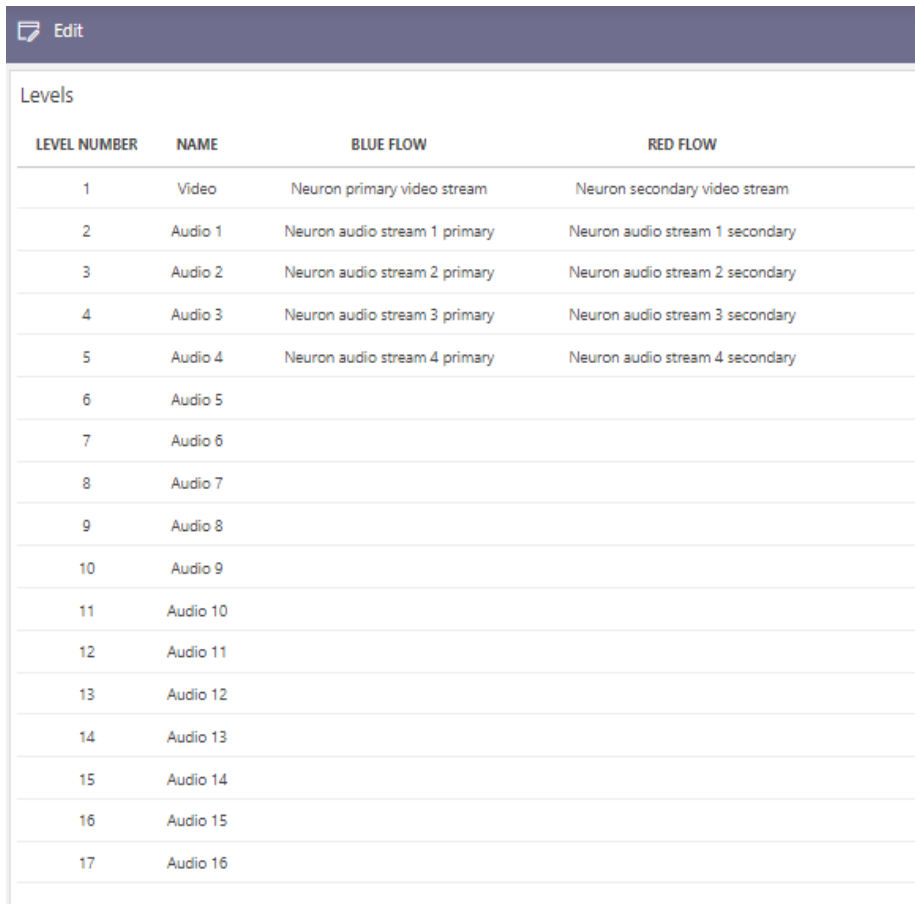
NAME	DESCRIPTION	ROLE	OPERATIONAL STATE	ADMINISTRATIVE STATE	GROUP TYPE DISPLAY VALUE	BUTTON LABEL	LAST MODIFIED BY	LAST MODIFIED	CREATED AT	CREATED BY	
IRD 1	...	IRD 1	Source	Up	Up	IP In	IRD 1	Reinout Daels	7-11-2023 14:32:55	12-9-2023 10:25:57	az_ziine_joey
IRD 9	...	IRD 9	Source	Up	Up	IP In	IRD 9	Reinout Daels	7-11-2023 14:32:55	12-9-2023 10:26:03	az_ziine_joey
IRD 5	...	IRD 5	Source	Up	Up	IP In	IRD 5	Reinout Daels	7-11-2023 14:32:55	12-9-2023 10:25:59	az_ziine_joey
<u>Neuron 15</u>	...	Neuron 15	Destination	Up	Up	SDI Out	Neuron 15	Reinout Daels	7-11-2023 14:43:19	12-9-2023 10:26:32	az_ziine_joey
Neuron 14	...	Neuron 14	Destination	Up	Up	SDI Out	Neuron 14	Reinout Daels	7-11-2023 14:43:20	12-9-2023 10:26:32	az_ziine_joey
IRD 17	...	IRD 17	Source	Up	Up	SDI In	IRD 17	Reinout Daels	7-11-2023 14:43:20	12-9-2023 10:26:04	az_ziine_joey
Multiviewer 12	...	Multiviewer 12	Destination	Up	Up	IP Out	MV 12	Reinout Daels	7-11-2023 14:53:15	12-9-2023 10:26:14	az_ziine_joey
Multiviewer 8	...	Multiviewer 8	Destination	Up	Up	IP Out	MV 8	Reinout Daels	7-11-2023 14:53:16	12-9-2023 10:26:12	az_ziine_joey
Multiviewer 3	...	Multiviewer 3	Destination	Up	Up	IP Out	MV 3	Reinout Daels	7-11-2023 14:53:34	12-9-2023 10:26:06	az_ziine_joey
Multiviewer 9	...	Multiviewer 9	Destination	Up	Up	IP Out	MV 9	Reinout Daels	7-11-2023 14:53:34	12-9-2023 10:26:12	az_ziine_joey

Metadata for convenient and error-free operation of large scale and dynamic operations:

- Admin and operational state
- Assign to areas and domains for easy searching and filtering
- **UMD & button** labels

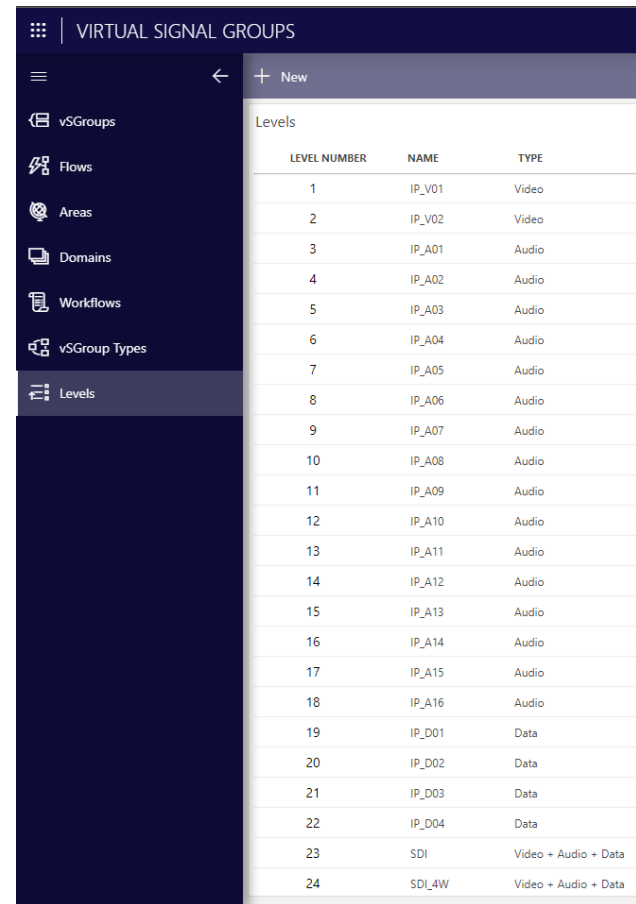
Virtual Signal Groups

Open database of sources & destinations



Levels

LEVEL NUMBER	NAME	BLUE FLOW	RED FLOW
1	Video	Neuron primary video stream	Neuron secondary video stream
2	Audio 1	Neuron audio stream 1 primary	Neuron audio stream 1 secondary
3	Audio 2	Neuron audio stream 2 primary	Neuron audio stream 2 secondary
4	Audio 3	Neuron audio stream 3 primary	Neuron audio stream 3 secondary
5	Audio 4	Neuron audio stream 4 primary	Neuron audio stream 4 secondary
6	Audio 5		
7	Audio 6		
8	Audio 7		
9	Audio 8		
10	Audio 9		
11	Audio 10		
12	Audio 11		
13	Audio 12		
14	Audio 13		
15	Audio 14		
16	Audio 15		
17	Audio 16		



VIRTUAL SIGNAL GROUPS

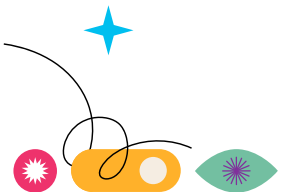
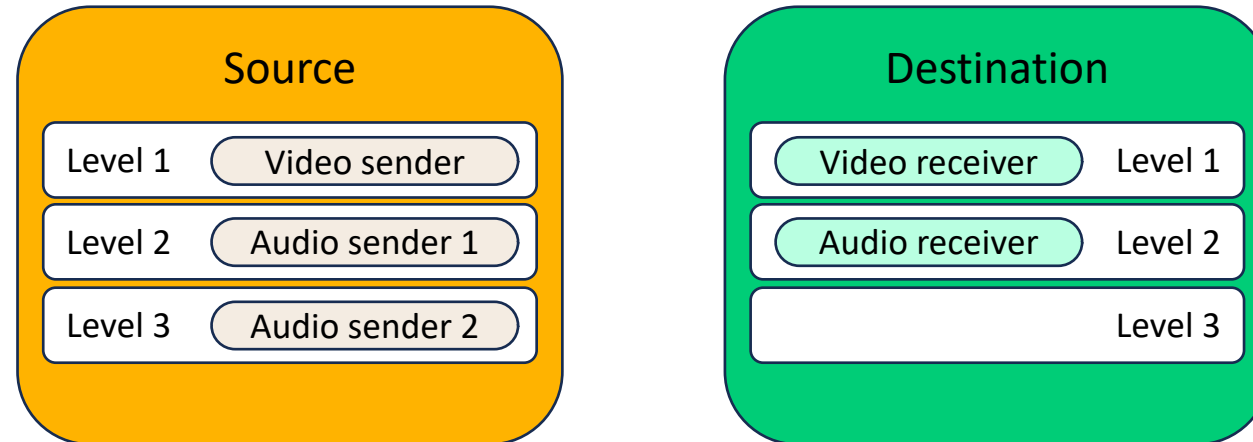
Levels

LEVEL NUMBER	NAME	TYPE
1	IP_V01	Video
2	IP_V02	Video
3	IP_A01	Audio
4	IP_A02	Audio
5	IP_A03	Audio
6	IP_A04	Audio
7	IP_A05	Audio
8	IP_A06	Audio
9	IP_A07	Audio
10	IP_A08	Audio
11	IP_A09	Audio
12	IP_A10	Audio
13	IP_A11	Audio
14	IP_A12	Audio
15	IP_A13	Audio
16	IP_A14	Audio
17	IP_A15	Audio
18	IP_A16	Audio
19	IP_D01	Data
20	IP_D02	Data
21	IP_D03	Data
22	IP_D04	Data
23	SDI	Video + Audio + Data
24	SDI_4W	Video + Audio + Data

- Each **sender/receiver is added on a specific level** in a source or destination.
- On every level, a **red flow and a blue flow** can exist
- **Level structure** for all sources & destinations **can be freely configured** inside the app

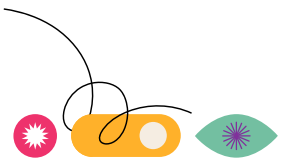
Virtual Signal Groups

Summary



Virtual Signal Groups

Create your own IP 2110 Source



Create your own (IP) source & connect it

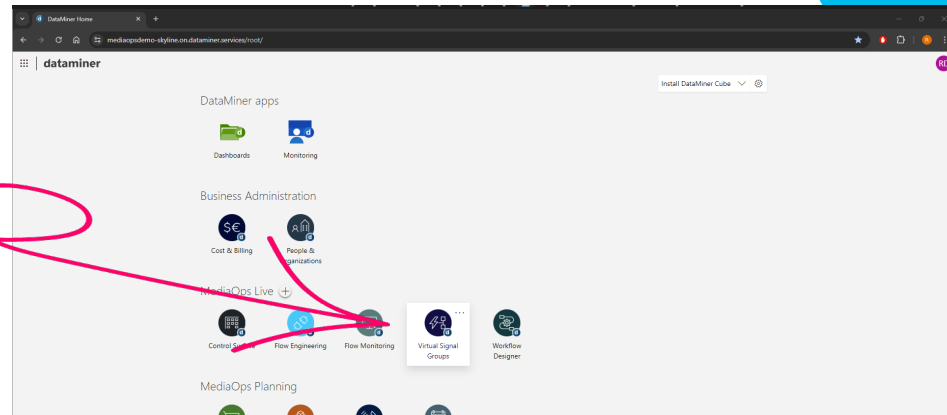
exercise

Flow senders & receivers

- Open "Virtual Signal Groups" app
- Navigate to "Flows" page
- New flow senders or receivers can be created

1 Manually

2 Automatically

A screenshot of the 'Virtual Signal Groups' Flows page. The page shows a table with columns for NAME, ADMINISTRATIVE ST..., OPERATIONAL STATE, FLOW DIRECTION, TRANSPORT TYPE, ELEMENT NAME, INTERFACE, SUB INTERFACE, SOURCE IP, DESTINATION IP, DESTINATION PORT, and BITRATE (Mbps). The table contains 16 rows of flow configurations. Two yellow callout boxes labeled '1' and '2' are positioned over the 'New' and 'Import' buttons in the top left of the table area.

NAME	ADMINISTRATIVE ST...	OPERATIONAL STATE	FLOW DIRECTION	TRANSPORT TYPE	ELEMENT NAME	INTERFACE	SUB INTERFACE	SOURCE IP	DESTINATION IP	DESTINATION PORT	BITRATE (Mbps)
SNP-2117490088 [2.1.04]02 vs Secondary	Up	Up	Tx	ST2110-20	SNP-2117490088 15-05	100006	8066ca03-6be0-3944-bf68-42f66457963	10.15.1...	239.15.12.20	50020	
SNP-2117490088 [3.2.01]02 ad Primary	Up	Up	Rx	ST2110-30	SNP-2117490088 15-05	100005	347bcbe1-d74c-317c-b16f-70d13bf718be				
SNP-2117490088 [3.2.01]08 ad Secondary	Up	Up	Rx	ST2110-30	SNP-2117490088 15-05	100006	23fcd26-773e-3495-9ad5-98935409178				
SNP-2117490088 [3.2.04]14 ad Secondary	Up	Up	Rx	ST2110-30	SNP-2117490088 15-05	100006	354288d1-e7fd-3530-952d-1876c5c5c7c				
SNP-2117490088 [3.2.01]08 ad Primary	Up	Up	Rx	ST2110-30	SNP-2117490088 15-05	100005	23fcd26-773e-3495-9ad5-98935409178				
SNP-2117490088 [3.2.04]02 vs Secondary	Up	Up	Tx	ST2110-20	SNP-2117490088 15-05	100006	49be7ce5-b58c-3510-bb0d-3f6d4268d0...	10.15.1...	239.15.24.20	50020	
SNP-2117490088 [3.2.04]12 ad Primary	Up	Up	Rx	ST2110-30	SNP-2117490088 15-05	100005	e2aa0e8b-7f55-31f2-842c-7420e3d52dbcc				
SNP-2117490088 [3.2.01]02 ad Secondary	Up	Up	Rx	ST2110-30	SNP-2117490088 15-05	100006	347bcbe1-d74c-317c-b16f-70d13bf718be				
SNP-2117490088 [2.1.04]01 ds Primary	Up	Up	Tx	ST2110-40	SNP-2117490088 15-05	100005	65c2a8c9-bda7-375c-8b17-b8f04de56a1e	10.14.1...	239.14.12.40	50040	
SNP-2117490088 [3.2.04]02 ad Secondary	Up	Up	Rx	ST2110-30	SNP-2117490088 15-05	100006	44399080-25d2-36d1-6394-b8ad5f1eb...				
SNP-2117490088 [1.2.01]02 vs Primary	Up	Up	Tx	ST2110-20	SNP-2117490088 15-05	100005	411ce103-694f-3898-bf16-86ba1ba39510	10.14.1...	239.14.5.20	50020	
SNP-2117490088 [2.1.04]11 ad Primary	Up	Up	Rx	ST2110-30	SNP-2117490088 15-05	100005	f93cfd6d-384c-3ebc-b261-d56863e2320f				
SNP-2117490088 [2.1.02]02 vs Primary	Up	Up	Tx	ST2110-20	SNP-2117490088 15-05	100005	c1f6c19b-cb7f-35d7-ba67-c83dfeba833	10.14.1...	239.14.10.20	50020	
SNP-2117490088 [2.1.03]01 ds Primary	Up	Up	Tx	ST2110-40	SNP-2117490088 15-05	100005	065e2514-9b76-3caf-9a6c-4d9954557019	10.14.1...	239.14.11.40	50040	
SNP-2117490088 [2.1.04]01 as Primary	Up	Up	Tx	ST2110-30	SNP-2117490088 15-05	100005	ac2de498-b78e-3b61-8645-26d335ecb249	10.14.1...	239.14.12.30	50030	
SNP-2117490088 [2.1.02]01 ds Secondary	Up	Up	Tx	ST2110-40	SNP-2117490088 15-05	100006	0c63e138-be48-3c4e-b20a-8a4463dcdff0	10.15.1...	239.15.10.40	50040	

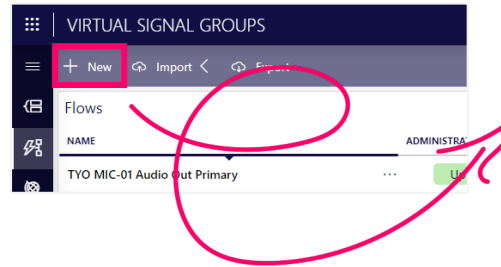


Create your own (IP) source & connect it

exercise

Create flow sender manually

- On the headerbar of the 'Flows' page, click 'New'
- Fill in the required fields for a flow sender
 - Name: [YOUR NAME]
 - Transport type: ST 2110-20
 - Operational state: Up
 - Admin state: Up
 - Element: LA CAM-01
 - Interface: 100001
 - Flow direction: Tx
 - IP Transport parameters
 - Source IP: 10.1.2.3
 - Destination IP: 232.10.20.30
 - Destination port: 5000
 - Click 'Save'

A screenshot of the 'Flow.Info' configuration form. The form is titled 'Flow.Info' and has a 'Save' button and a 'Delete' button. The form contains several fields:

- Name: MyFlow
- Transport Type: ST2110-20
- Operational State: Up
- Administrative State: Up
- Flow.Path:
 - Element: LA CAM-01
 - Interface: (empty)
 - Sub Interface: (empty)
- Flow Direction: Tx
- Flow.Transport:
 - Source IP: 10.1.2.3
 - Destination IP: 232.10.20.30



Create your own (IP) source & connect it

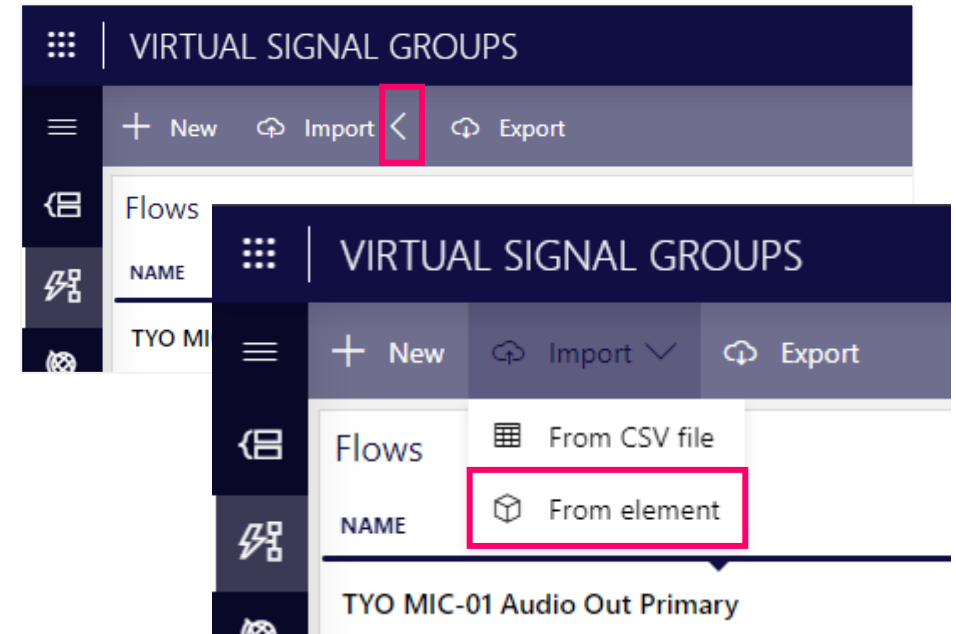
exercise

Create flow senders/receivers automatically

- On the headerbar of the 'Flows' page, click the arrow next to 'Import'
- In the dropdown menu that appears, click 'From element'
- Select the element "NY IRD-01"
- Select all senders available on the element
- Click 'Generate'



Currently only supported for 'AMWA NMOS IS-05' connector

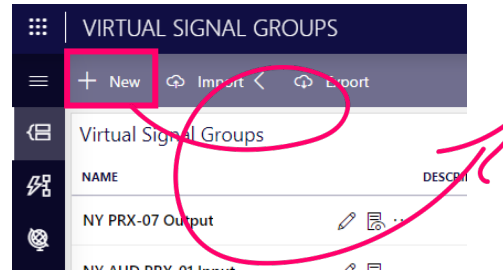


Create your own (IP) source & connect it

exercise

Create your source virtual signal group

- Navigate to the 'vSGroups' page in the app
- On the header bar of the page, click the 'New' button
- Fill in the required fields for a flow sender
 - **Name:** NY IRD-01
 - **Role:** Source
 - **Operational state:** Up
 - **Admin state:** Up
 - **Type:** IP
 - **Button label:** NY IRD-01
- Click 'Save'



The screenshot shows the 'VirtualSignalGroup.Info' form. The form contains the following fields:

- Name: NY IRD-01
- Description: (empty)
- Role: Source
- Operational State: Up
- Administrative State: Up
- Type: IP
- VirtualSignalGroup.SystemLabels: (empty)
- UMD Label: (empty)
- Button Label: NY IRD-01

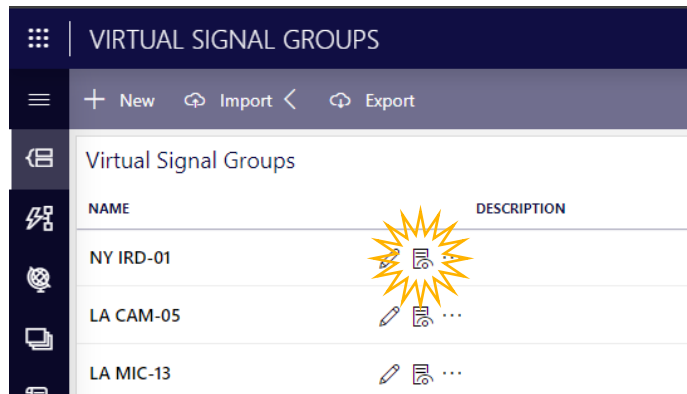


Create your own (IP) source & connect it

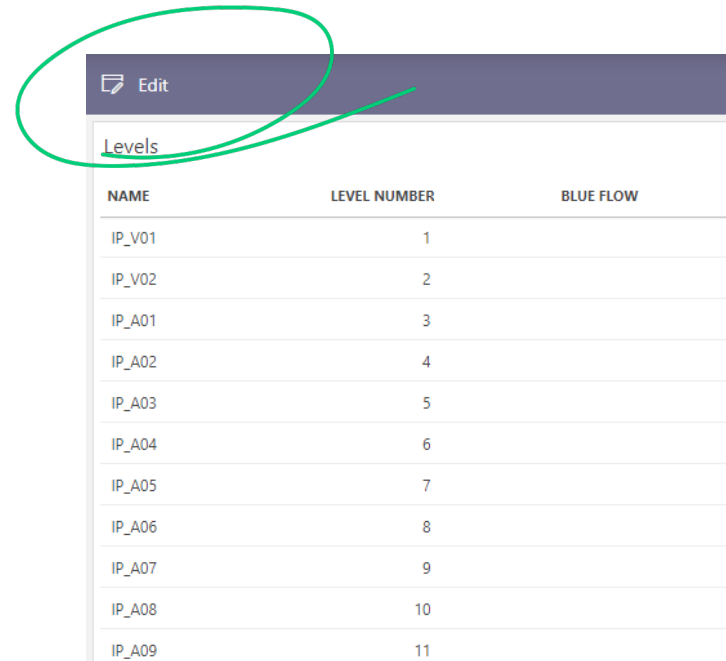
Add flow senders to your newly created source

exercise

- Find your source in the Virtual Signal Groups table (tip: sort by 'created at' or use the table search)
- Click the 'show content' button
- Click 'Edit'



NAME	DESCRIPTION
NY IRD-01	
LA CAM-05	
LA MIC-13	



NAME	LEVEL NUMBER	BLUE FLOW
IP_V01	1	
IP_V02	2	
IP_A01	3	
IP_A02	4	
IP_A03	5	
IP_A04	6	
IP_A05	7	
IP_A06	8	
IP_A07	9	
IP_A08	10	
IP_A09	11	



Create your own (IP) source & connect it

Add flow senders to your newly created source

exercise

- 1 Select the level where you want to add the sender (Video 1/Audio 1/Audio 2) in the 'Levels' table
 - Find the sender you want to add in the 'Flows' table below and select it
- 2
 - Via filtering on the 'Name' column
 - By sorting on the 'Created at' column
 - By using the table search
- 3 Click 'Assign Flow (blue)'
 - Repeat for the three senders from the IRD element that we auto-generated
 - You should then have the following as content of your virtual signal group

NAME	LEVEL NUMBER	BLUE FLOW
IP_V01	1	NY IRD-01 Video Out Primary
IP_V02	2	
IP_A01	3	NY IRD-01 Audio 1 Out Primary
IP_A02	4	NY IRD-01 Audio 2 Out Primary

VIRTUAL SIGNAL GROUPS

NY IRD-01

Levels

NAME	LEVEL NUMBER	BLUE FLOW
IP_V01	1	
IP_V02	2	
IP_A01	3	
IP_A02	4	
IP_A03	5	
IP_A04	6	
IP_A05	7	
IP_A06	8	

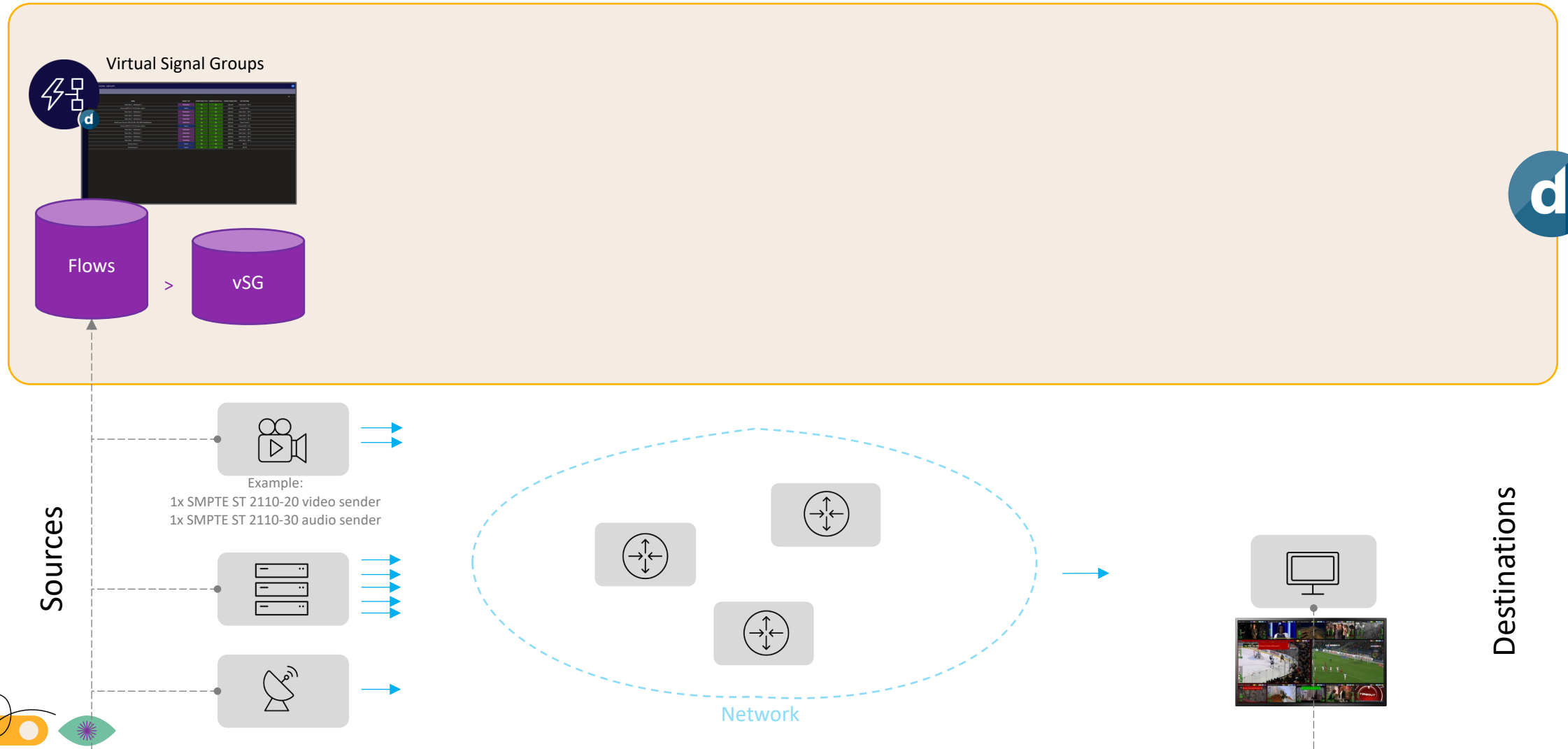
Flows

NAME	ADMINISTRATIVE STATE	OPERATIONAL STATE	FLOW DIRECTION	TRANSPORT TYPE	INTERFACE	SOU
NY IRD-01 Audio 1 Out Primary	Up	Up	Tx	ST2110-20	100001	10.1
NY IRD-01 Video Out Primary	Up	Up	Tx	ST2110-20	100001	10.1
NY IRD-01 Audio 2 Out Primary	Up	Up	Tx	ST2110-20	100001	10.1

Buttons: Assign Flow (blue), Remove Flow (blue)

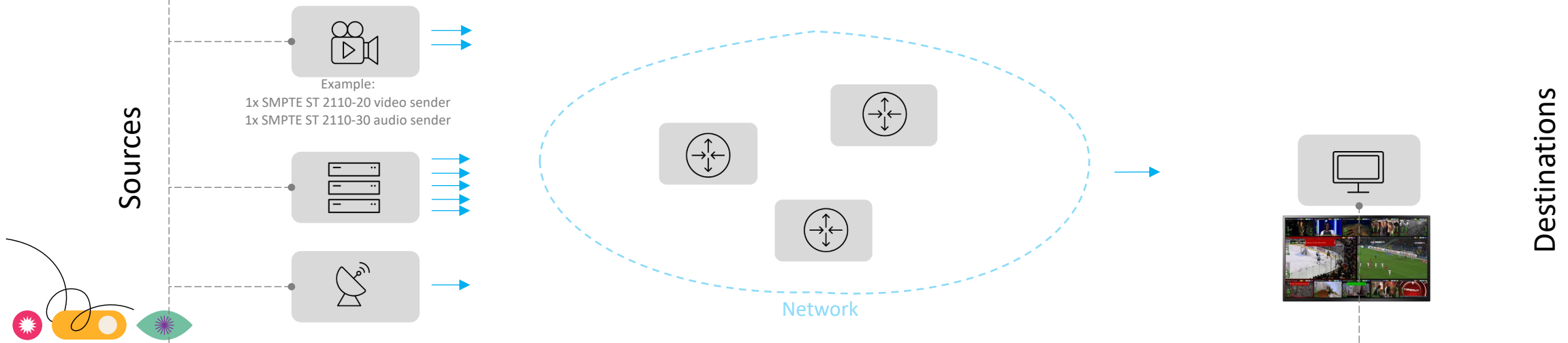
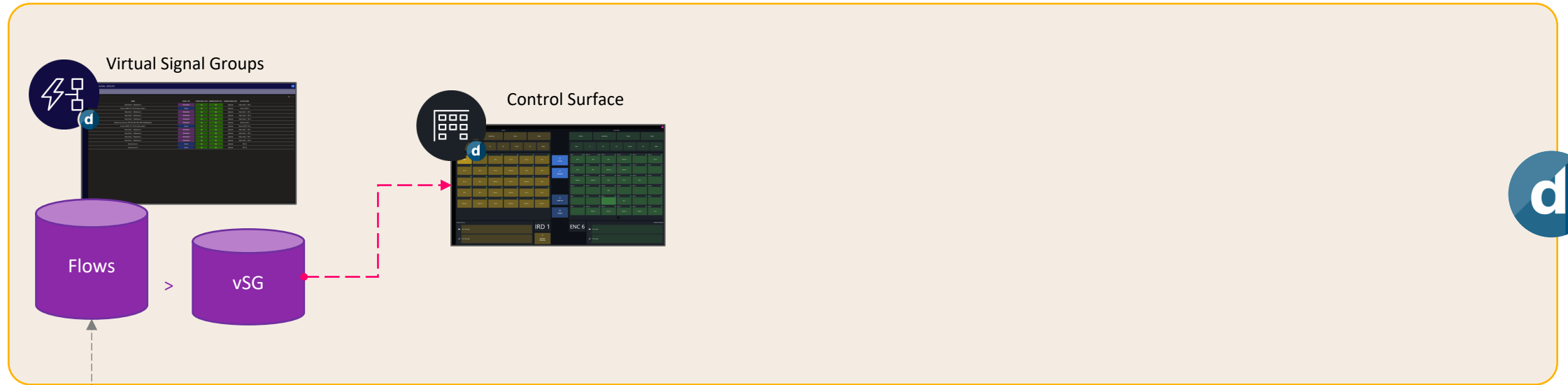
DataMiner MediaOps LIVE

High-level picture



DataMiner MediaOps LIVE

High-level picture



Create your own (IP) source & connect it

Connect your newly created source to a destination

exercise

- Navigate to the Control Surface app
- Find the button for your newly created source
- Connect the source you just created it to a MV PIP in the MCR

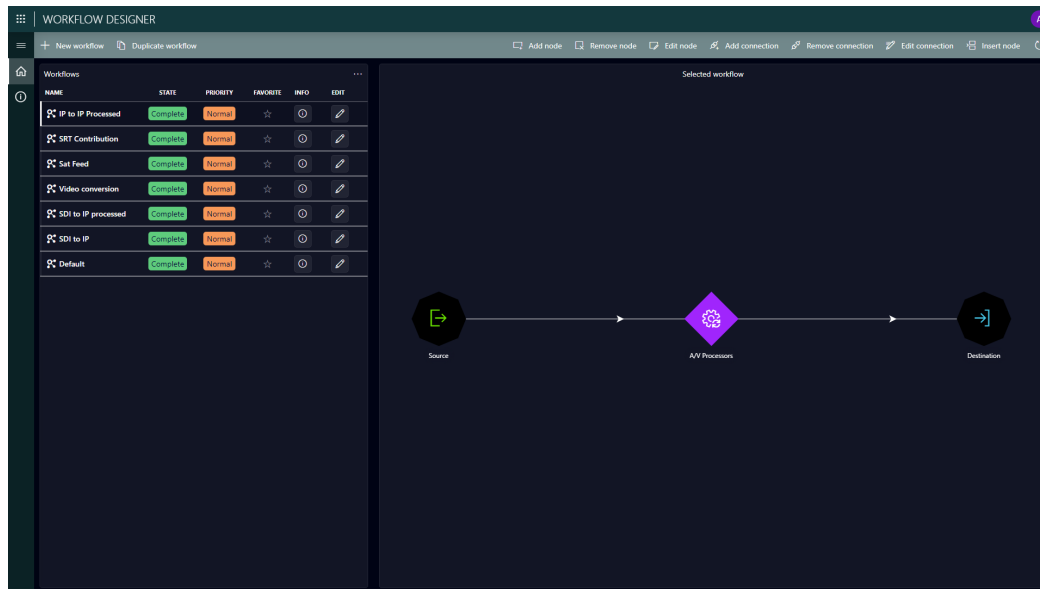


BONUS: change the admin state & operations state of your source and see the effect on the control surface

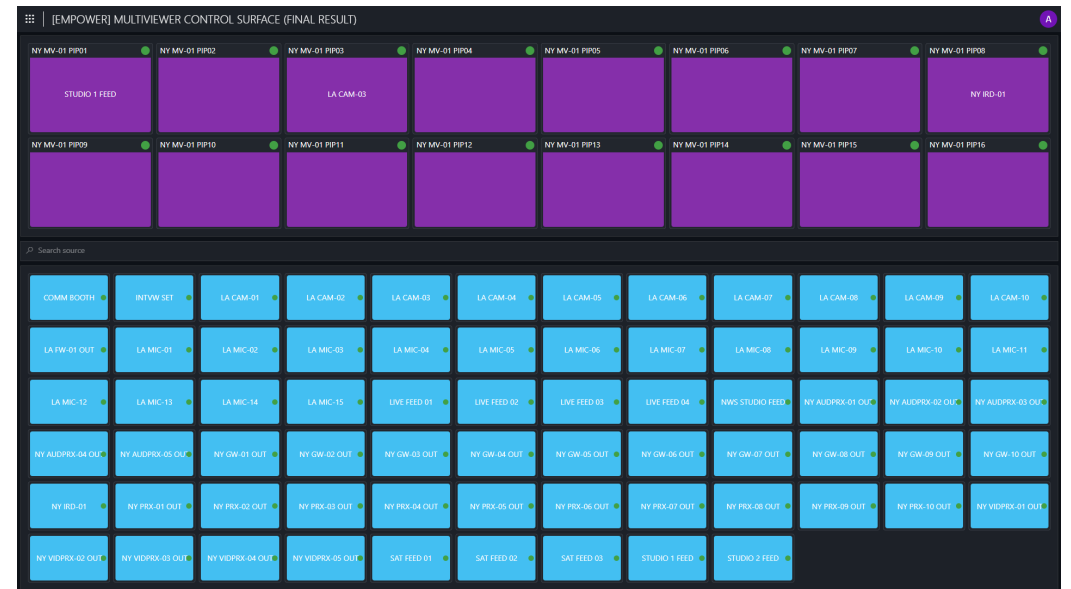


Later today (16h40 - 17h20)

dataminer.MediaOps LIVE part 2



Create and run your own workflow

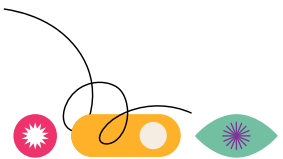


Build a custom control surface



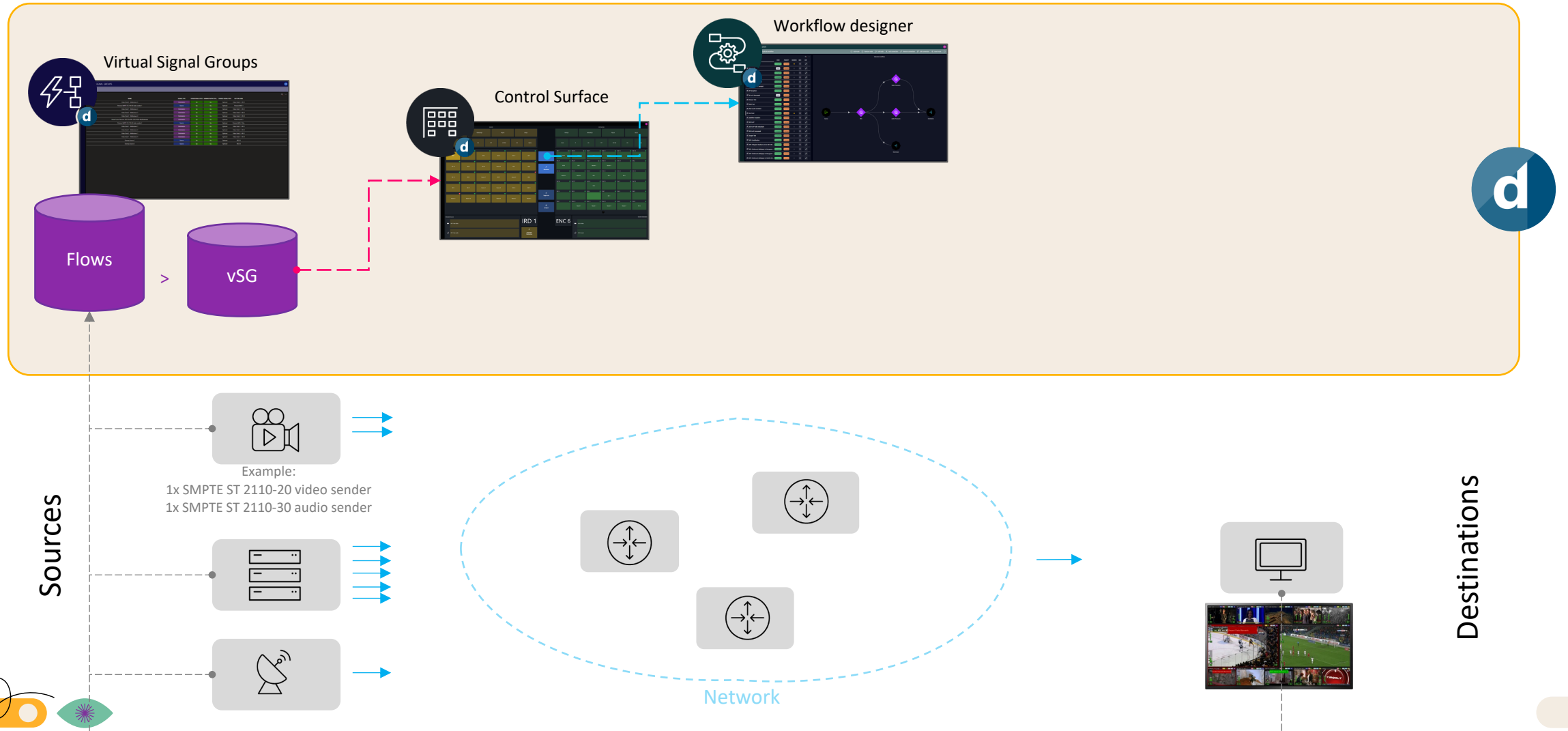
Workflow designer

Build and run your own workflow



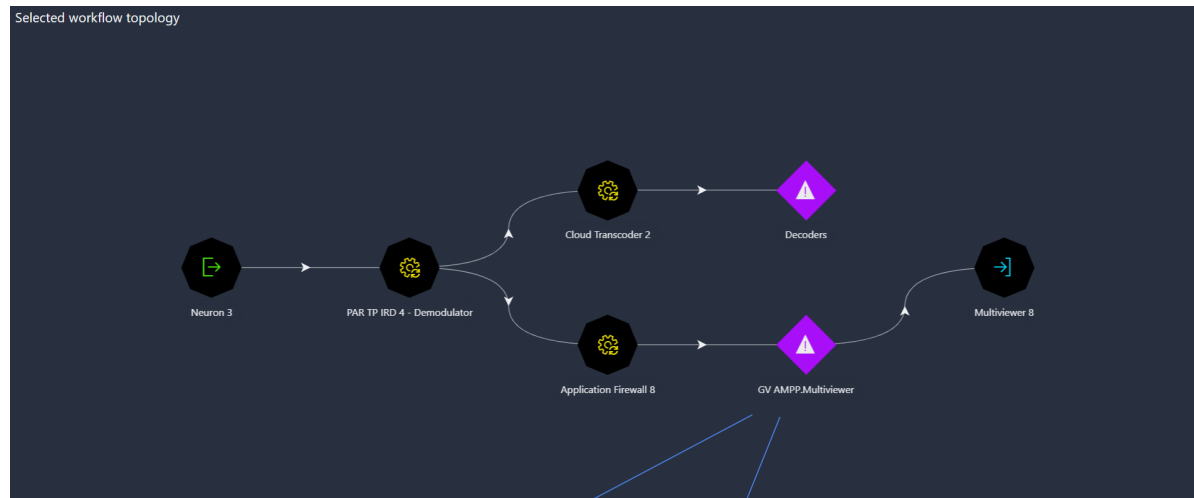
DataMiner MediaOps LIVE

High-level picture



Workflow Designer

Design your technical workflow with ease



Swap resources
Open element
Ad-hoc control

Operator-level **devops** environment to create technical workflows

A workflow **describes** how **signals** (vSG) are processed from source to destination using a **sequence of nodes** (resources or resource pools)

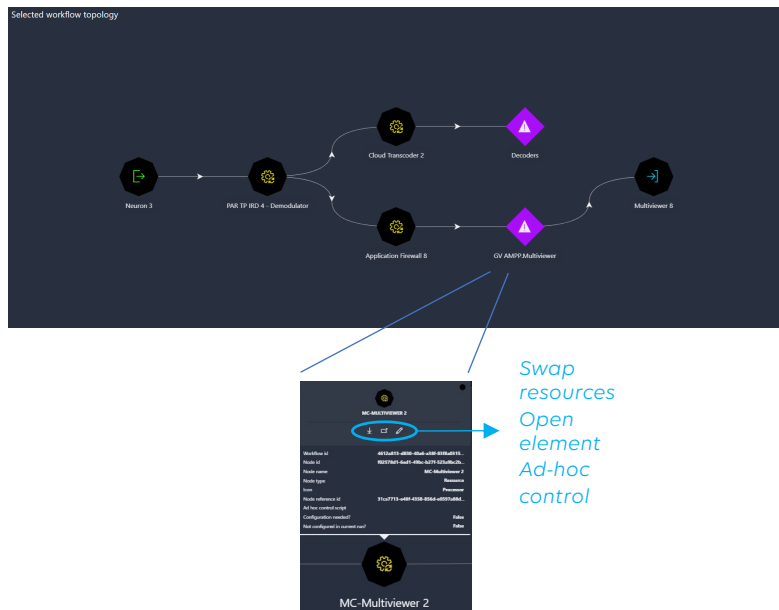
Additionally, a workflow describes

- How the nodes in the workflow need to be connected by Flow Engineering
- What automation is run as part of the workflow
- Whether or not resources and capacity are reserved or not
- If and how the service needs to be monitored

Workflow Designer

Create workflow

TECHNICAL WORKFLOW DESCRIPTION



LIST OF NODES & TOPOLOGY

Input and output **signal descriptions** (vSG)

Resources and resource **pools**

Connectivity (optional) between nodes : L-band, ASI, SDI levels, SMPTE ST 2022, SMPTE ST 2110 (including level selection)

NODE AUTOMATION BEHAVIOR

Selection of the operator **ad-hoc fast-control** script or each node (IAS)

Enable or disable **automatic node configuration** at job-start time with job-defined configuration parameters

Order of sequence for node and connectivity automated configuration

Operator indicator that **manual operator configuration is required**

Custom automation logic (only if default automation behavior needs customization^o)

NODE RESERVATION BEHAVIOR

Enable or disable reservation for each individual node : makes it easy to add **non-bookable assets** to the WO

SERVICE MONITORING

Select when to **start service monitoring** : create DataMiner service instantly or at job start

Select when to **stop service monitoring** : delete DataMiner services at the end of the job or not

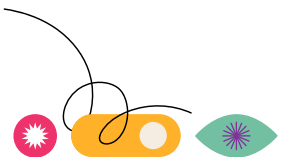
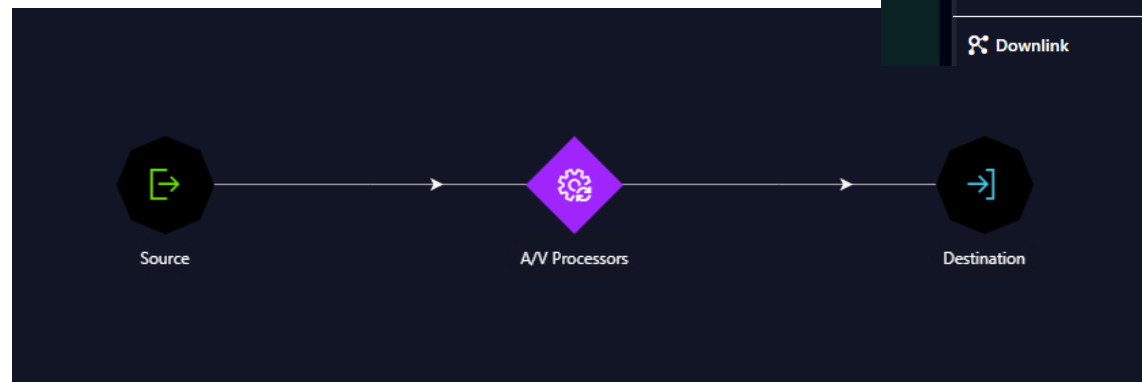
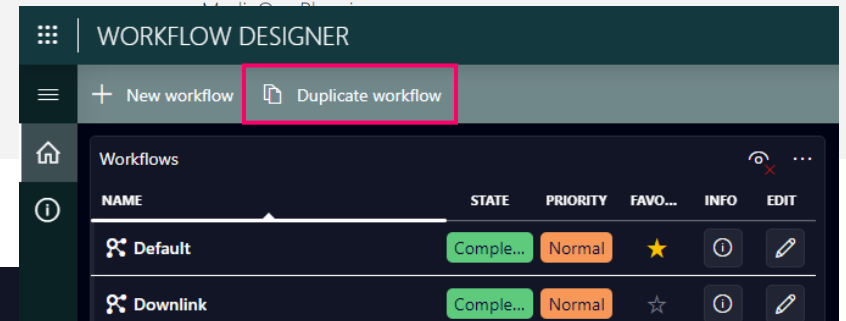
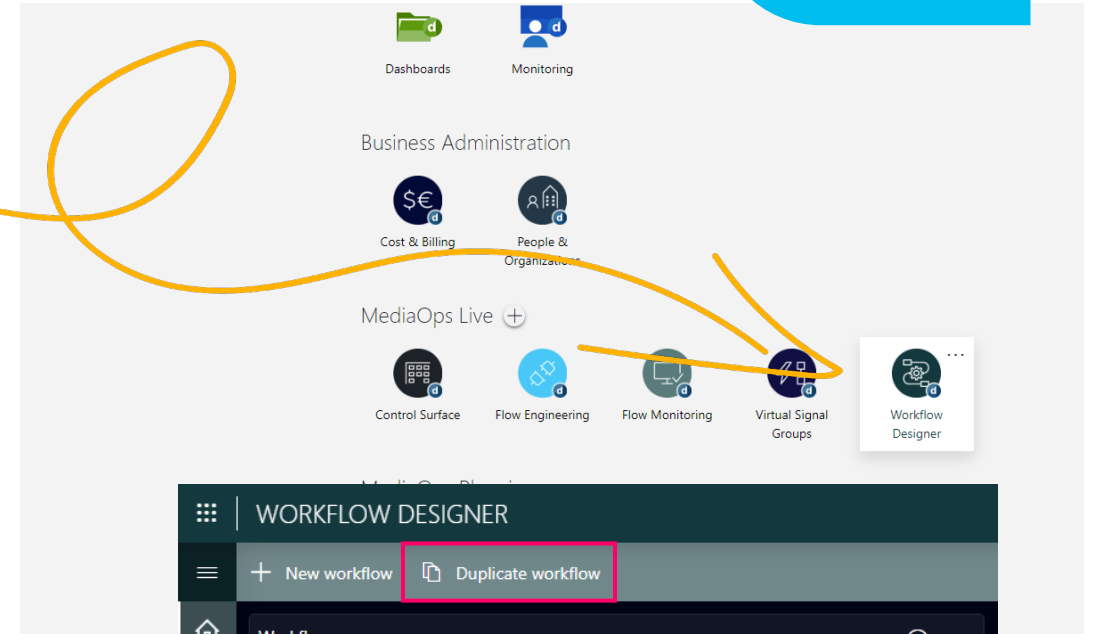
Optionally select the service **visualization** by selecting a Visio Service Template

Build and run your own workflow

Create your workflow from an existing one

- From the home page of your system, open the Workflow Designer app
- Duplicate the default workflow
- Click the connection between the source and destination and click 'insert node' on the app's header bar
- Select 'resource pool' and then 'A/V Processors'

exercise



Build and run your own workflow

Options on node in a workflow

Node configuration

Optional alias IRD

Include in booking

Auto-select resource at job creation

Configuration needed

Control script Filter <

Parameters

Back Save



Build and run your own workflow

Options on connection in a workflow

Connection configuration

Type	Level Based	<
Subtype	All	<
Execution order	0	
Execution script	Filter	<

Save



 **BONUS**

Workflow designer

Run your workflow from the control surface

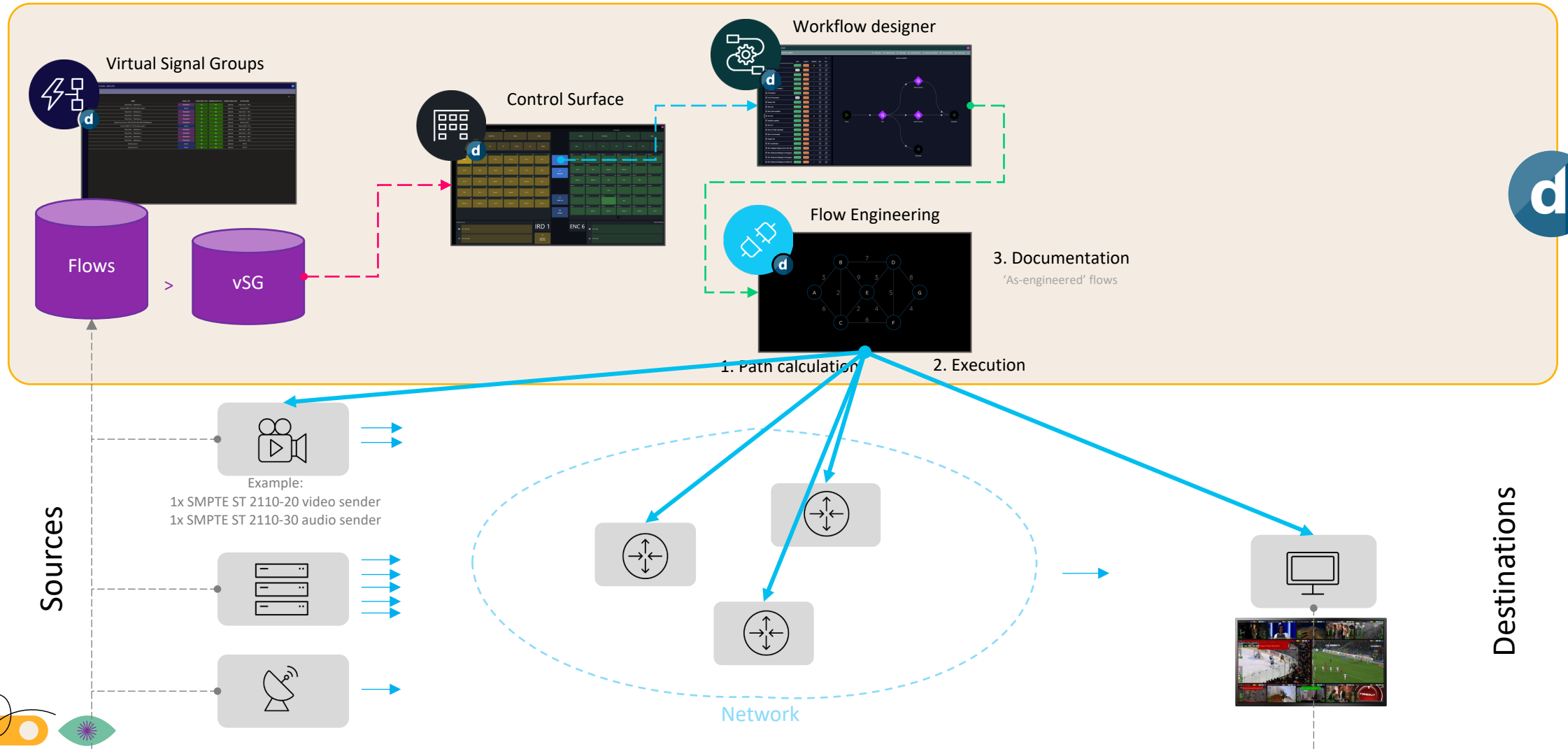
exercise

- Go to Virtual Signal Groups app
- Navigate to 'Workflows' page
- Find and open the 'IP to IP' entry in the table
- Change the workflow field from 'Default' to your newly created workflow
- Open the Control Surface app
- Connect the source you created earlier it to a MV PIP in the MCR
- See that a resource gets automatically inserted in the middle of the control surface
- Verify the resulting flow paths in the flow monitoring app
- Change the workflow back from your own custom one to 'default' for the remainder of the session



DataMiner MediaOps LIVE

High-level picture



Flow Engineering

A native IP flow management and orchestration engine

1. Flow path calculation from source to destination

Uses **physical topology** discovered & documented in DataMiner (DCF on connectors)

Runs a **Dijkstra** algorithm : cost-based routing

Resource and **capacity** scheduling*

Blocking* and **non-blocking** networks

2. Flow documentation

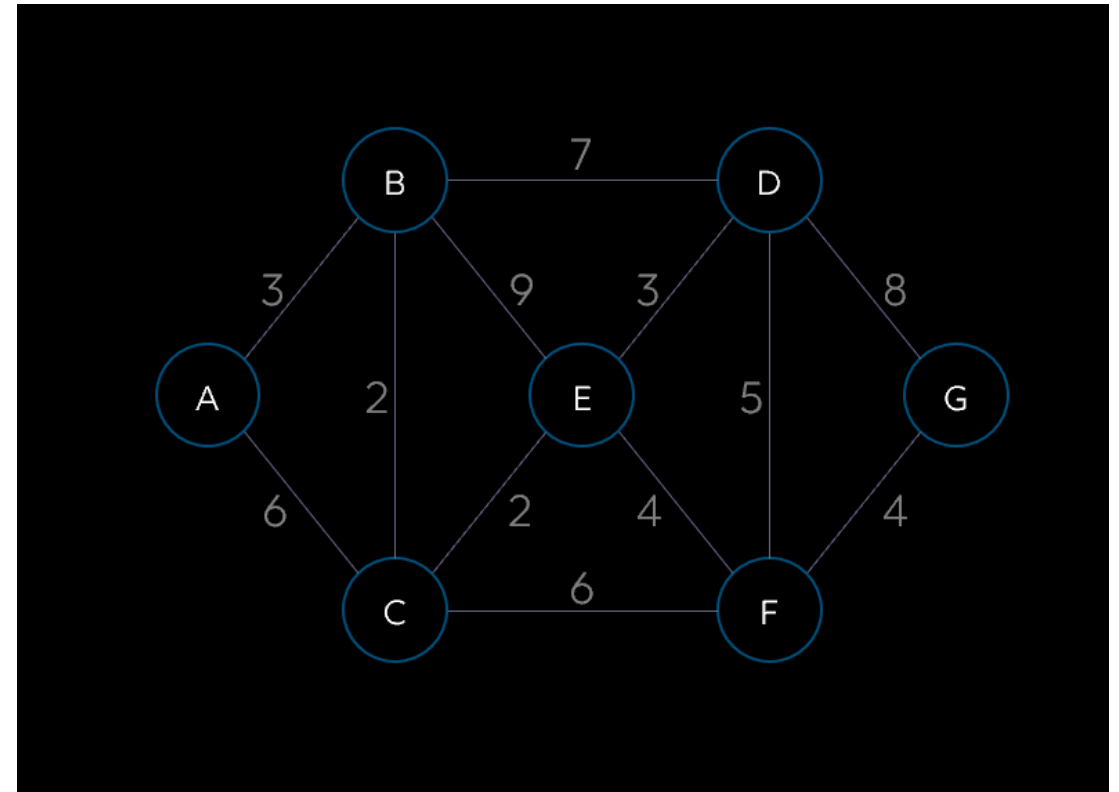
Document as-engineered flows

Unified across the domains (edges + network fabric)

3. Trigger flow execution

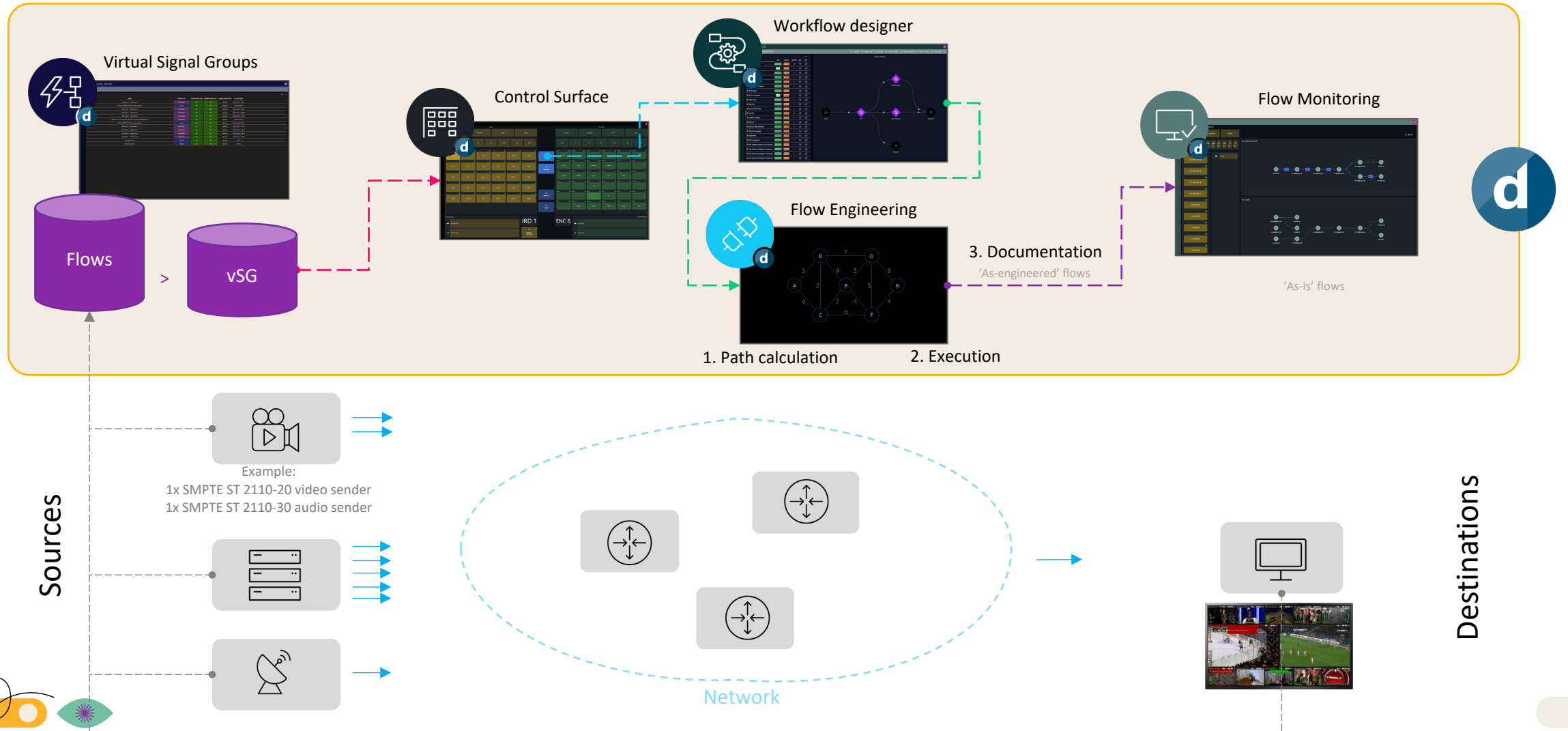
Controls elements to set up a connection with a **standardized message** to the connector

Controls edge senders, edge receivers, network switches and routers and controllers



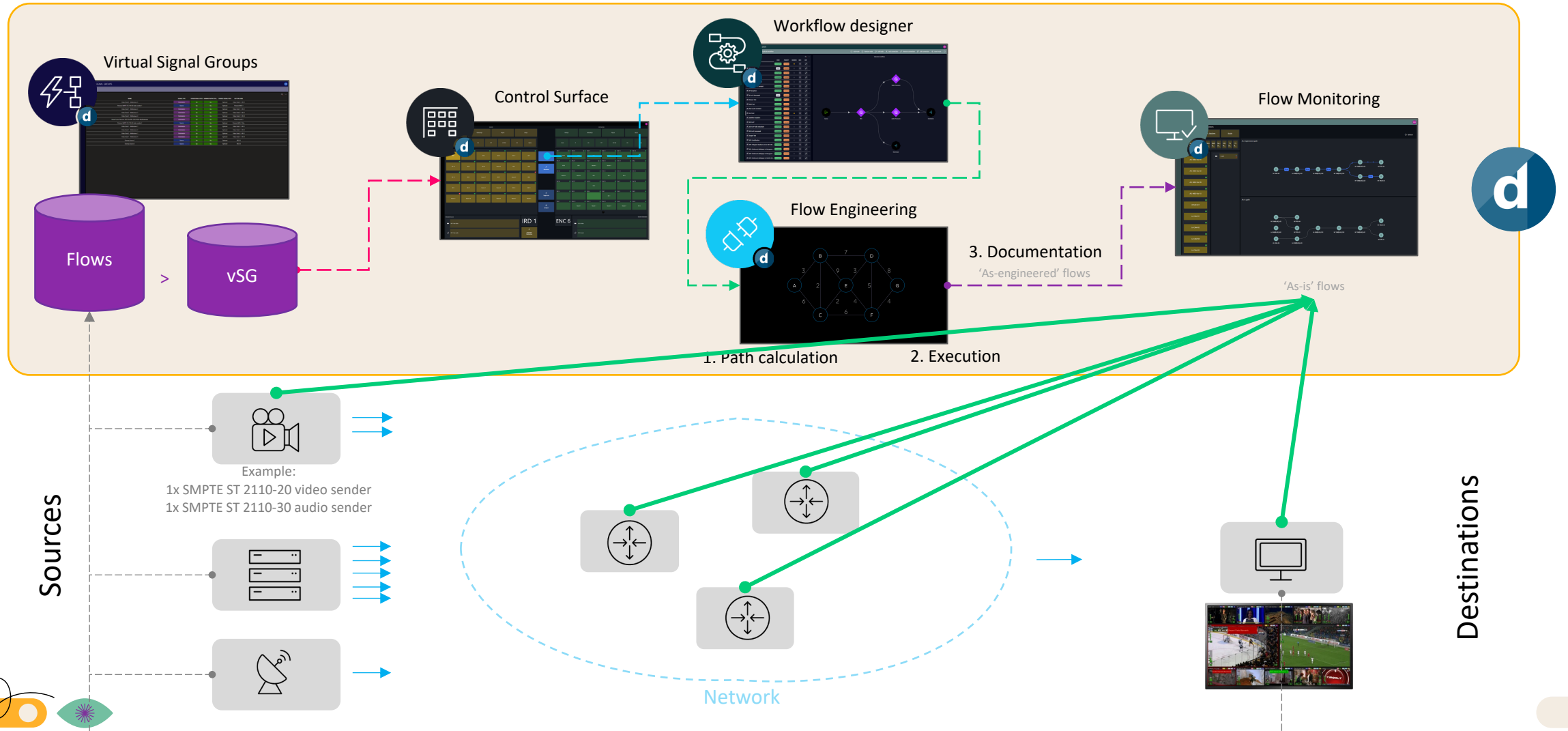
DataMiner MediaOps LIVE

High-level picture



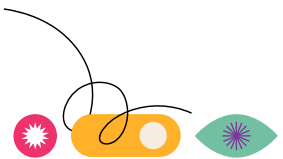
DataMiner MediaOps LIVE

High-level picture



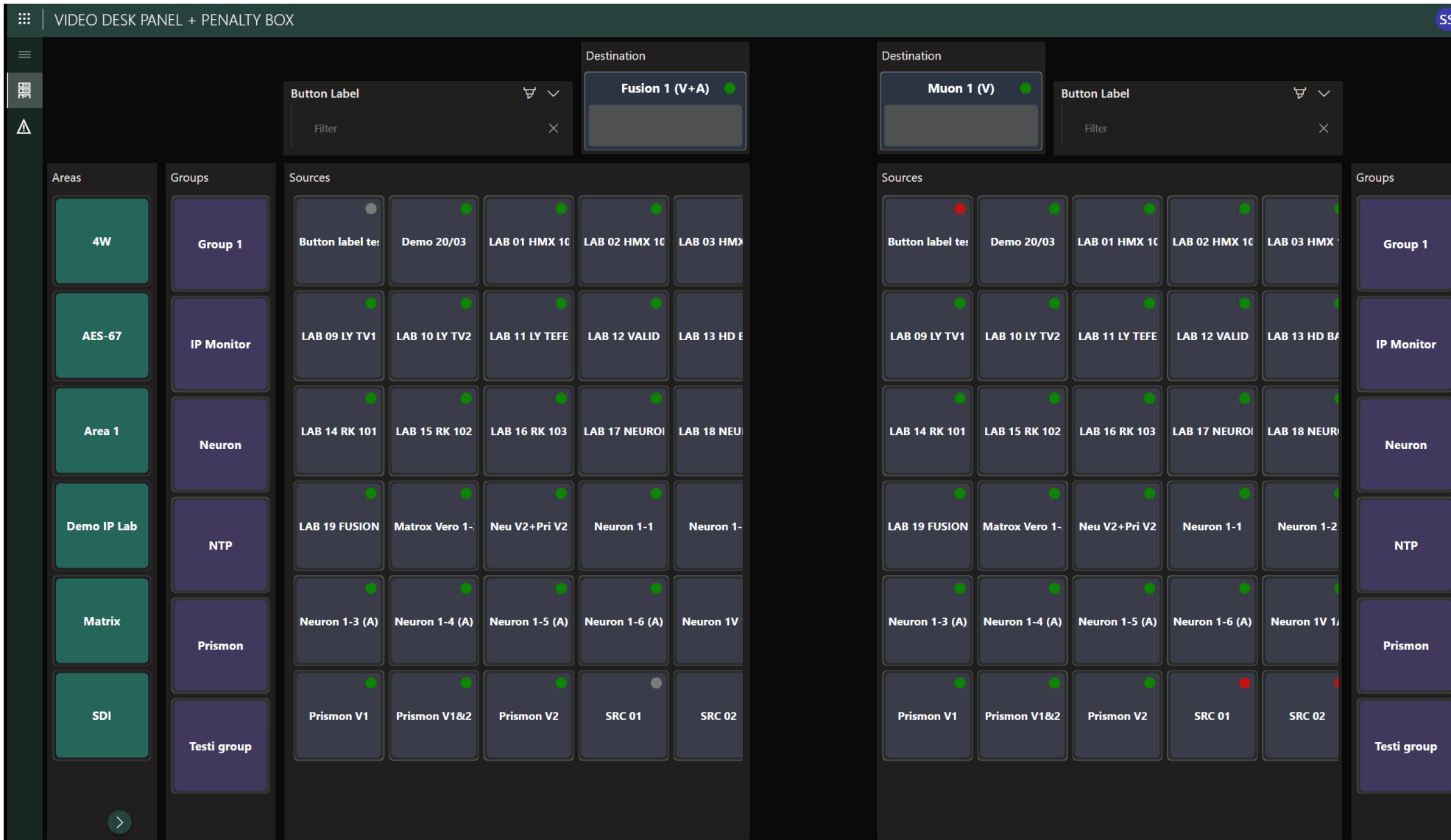
Control Surface

Customize the standard control surface to your needs



Control Surfaces

Personalized, desk-aware, task-oriented, schedule aware



Sources & destinations shown as either **buttons in a grid or rows in a table**

Mix and match with any other dashboard component

Control & monitor

Dynamic population based on GQL

Custom **look & feel**

Easy navigation

Pagination, filters, search, ...

XY, single dest. ...

Control Surfaces

Personalized, desk-aware, task-oriented, schedule aware

The screenshot displays a control interface with a dark theme. At the top, a blue header bar contains a menu icon, the text "CONNECTION PANEL", and a "SS" status indicator. The main area is divided into several sections:

- Areas:** A vertical sidebar on the left contains buttons for "4W", "Area 1", "Demo", "Demo IP Lat", "Digita", "Kytikis", "SDI", "Studios", "Subs", and "Testinappi".
- Groups:** A horizontal row of buttons labeled "Demo", "Group 1", "IP Monitor", "Neuron", and "NTP". Below it, another row contains "Prismon" and "Testi group".
- Sources:** A table with columns: "BUTTON LABEL", "OPERATIONAL STATE", "DESCRIPTION", and "GROUP TYPE". It lists various sources like "Neuron 1-5 (A)", "Neu V2+Pri V2", etc., with their operational states (Up/Down) and group types (MCR IP In).
- Destinations:** A list of destination buttons on the right, including "Fusion 1", "Muon 1", "LAB 23 NEURC", etc.
- Control Buttons:** Three large buttons are positioned in the center: "Connect" (blue), "Disconnect" (dark blue), and "Configure" (orange).
- Parameter Configuration Dialog:** A white modal window is open, titled "Parameter Configuration". It has three columns: "INPUT SOURCE", "OUTPUT", and "OUTPUT GAIN". The "OUTPUT" column shows a dropdown menu with "Ch1" through "Ch16" selected. The "OUTPUT GAIN" column shows input fields with "Default Gain" and a value of "0". At the bottom are "Cancel" and "Confirm" buttons.

Large scale operations

Embedded ad-hoc operations

IA for resource selection and scheduling

Customized workflows

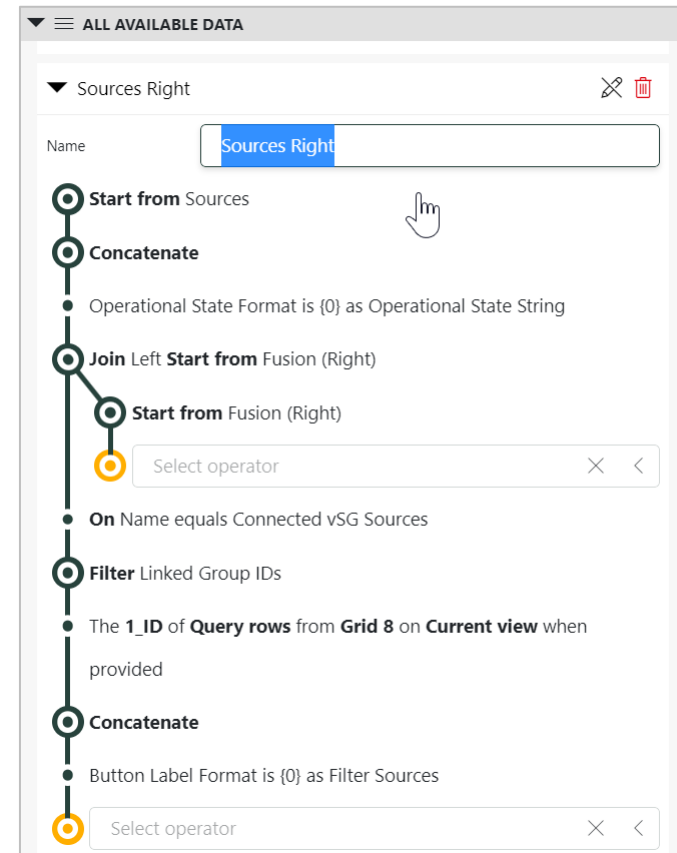
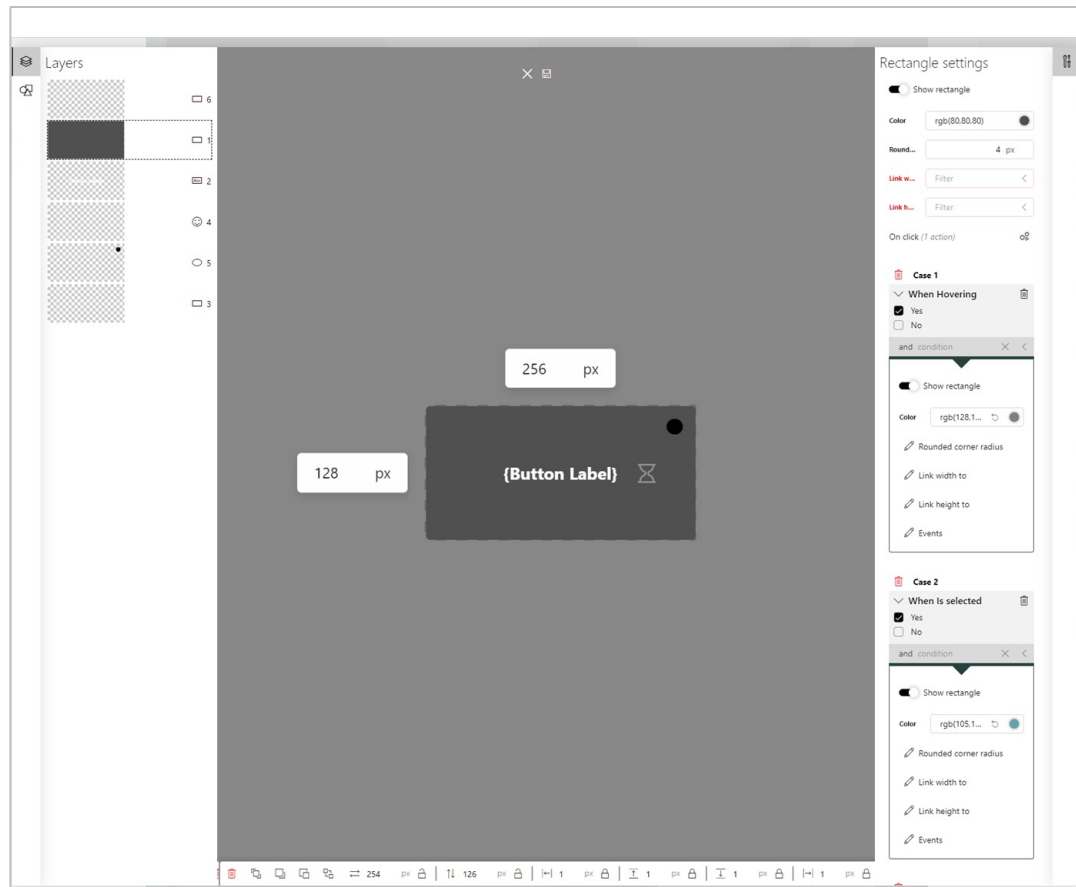
UI and API

Dataminer.services sharing

Remote operation

Control Surfaces

Devops environment is the baseline for continuous evolution



Developed and operated in **low-code apps**

Flexible GQL data query for button data, KPI's, etc.

Visualization of buttons can be **customized with visual editor**

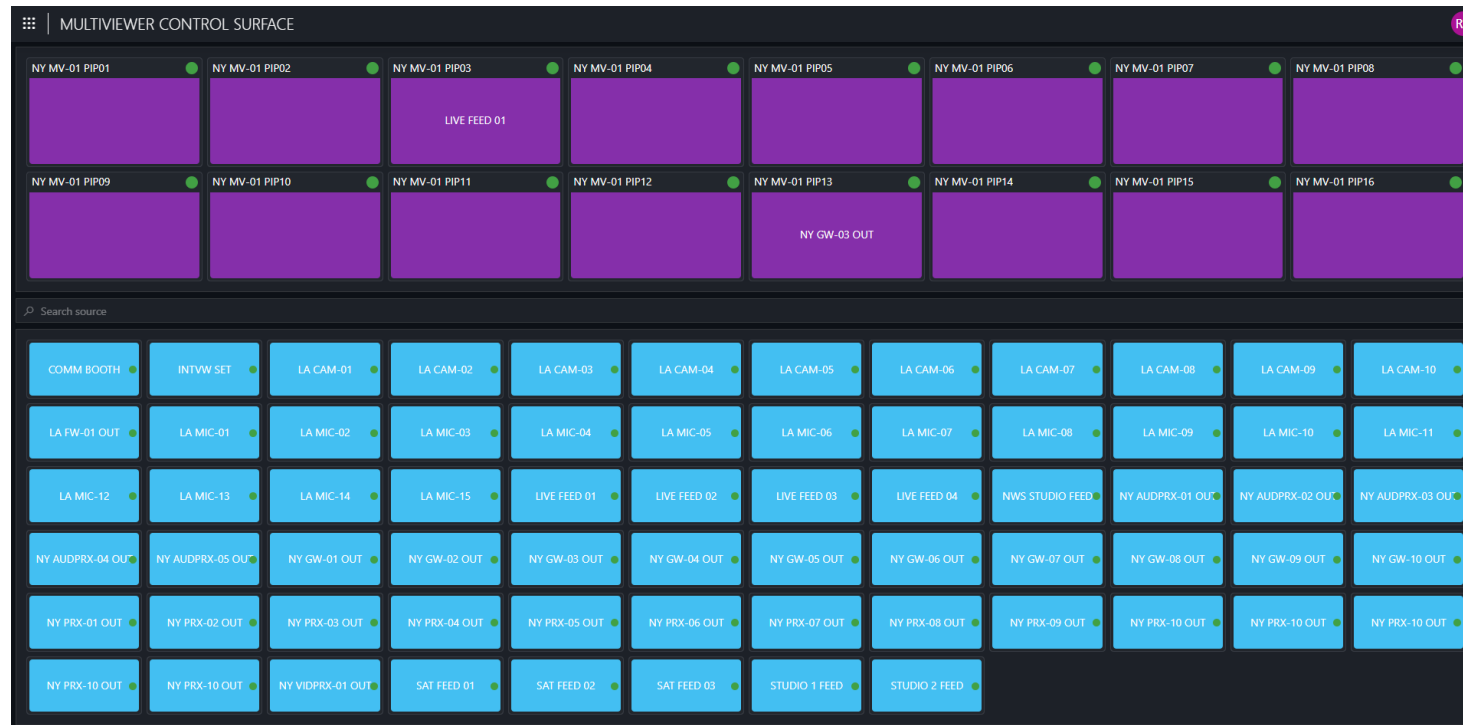
Buttons may be enhanced with additional info and links

Tailored to the user, position, event

Control Surface

- The out-of-the-box control surface is built on the Low-Code apps framework
- This allows it to be easily tweaked towards specific audiences/use cases

✦ • Exercise: create this multiviewer control surface:

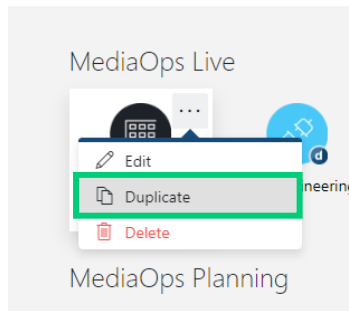


Control Surface

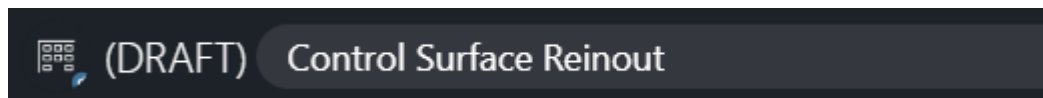
Tweak the lay-out of the control surface

exercise

- Start by making a duplicate of the standard app



- Call it something like 'Control Surface *your name*'

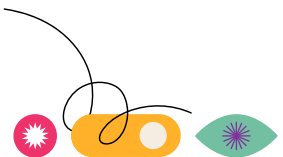
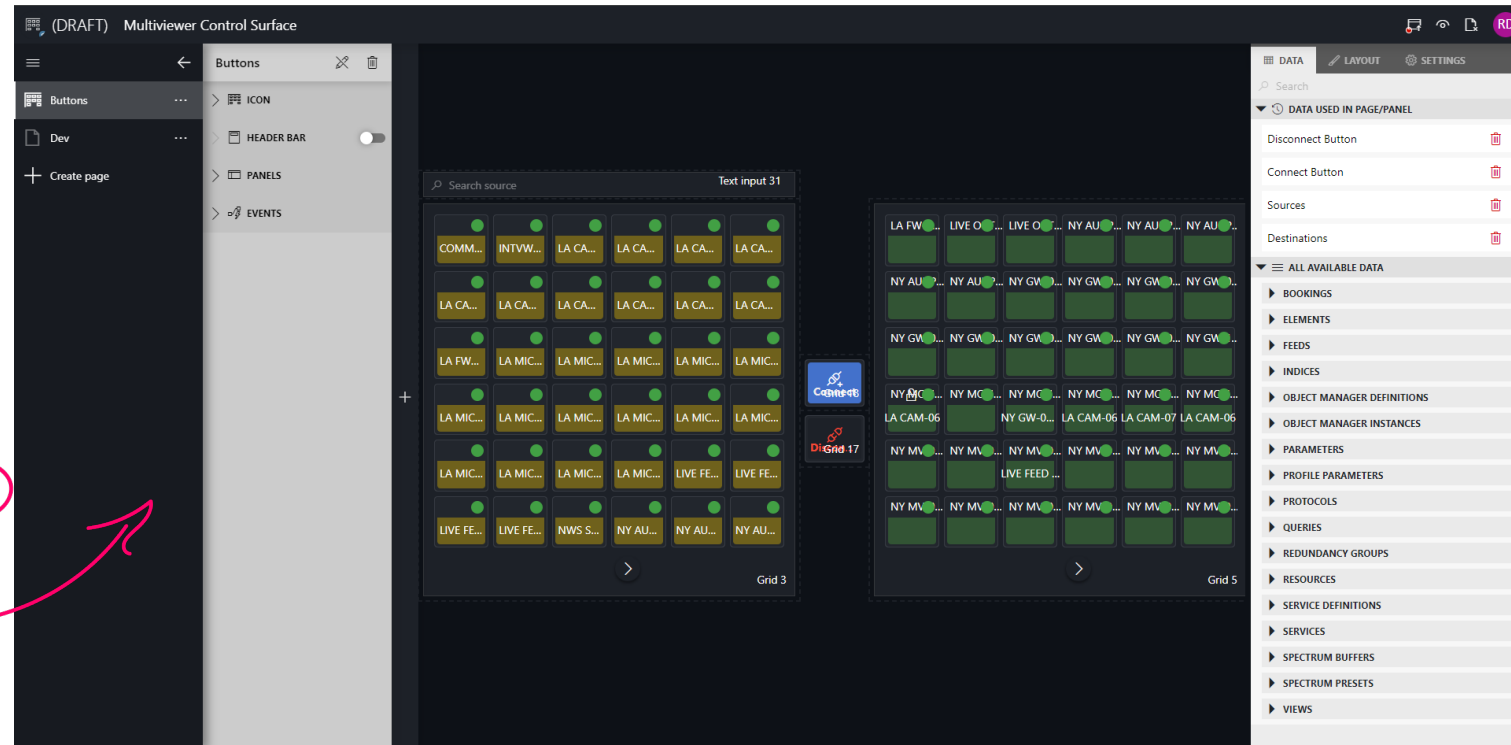


Control Surface

Tweak the lay-out of the control surface

exercise

- Delete some components to make the control surface a bit less complex
- Delete all components except for:
 - The source buttons (grid 3)
 - The destination buttons (grid 5)
 - The source search box (text input 31)
 - The connect button (grid 18)
 - The disconnect button (grid 17)
- You will be left with this lay-out



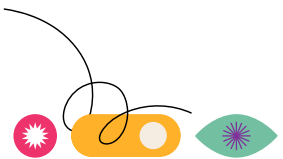
Control Surface

Tweak the lay-out of the control surface

exercise

- Rearrange the remaining components as follows:

The screenshot displays a control surface design tool interface. The main workspace is divided into two primary sections: "Destinations" (top) and "Sources" (bottom). The "Destinations" section is a 6x6 grid of green buttons, each with a status indicator (green dot) and a label such as "LA FW-01 IN", "LIVE OUT 01", "NY AUDPRX-01 IN", etc. The "Sources" section is a 6x6 grid of yellow buttons, each with a status indicator (green dot) and a label such as "COMM BOOTH", "INTVW SET", "LA CAM-01", etc. A search bar is located at the top of the "Sources" grid. To the right of the main workspace is a sidebar with tabs for "DATA", "LAYOUT", and "SETTINGS". The "DATA" tab is active, showing a search bar and two sections: "DATA USED IN PAGE/PANEL" and "ALL AVAILABLE DATA". The "ALL AVAILABLE DATA" section lists various data categories like BOOKINGS, ELEMENTS, FEEDS, INDICES, etc. On the left side of the interface, there is a dark sidebar with a menu icon, a back arrow, and a "Buttons" panel. The "Buttons" panel contains a search bar and a list of components: "ICON", "HEADER BAR", "PANELS", and "EVENTS". The "Buttons" panel is currently open, showing a list of buttons with a search bar and a "Create page" button. The overall interface is dark-themed with a grid-based layout.



Control Surface

Tweak the lay-out of the control surface

exercise

- Filter the destination buttons so that only multiviewer destinations are shown
- Under 'Queries', find 'Destinations' and click the pencil icon to edit the query

(DRAFT) Multiviewer Control Surface

Buttons

Buttons

Dev

Create page

Buttons

ICON

HEADER BAR

PANELS

EVENTS

LA FW-01 IN

LIVE OUT 01

LIVE OUT 02

NY AUDPRX-01 IN

NY AUDPRX-02 IN

NY AUDPRX-03 IN

NY AUDPRX-04 IN

NY AUDPRX-05 IN

NY GW-01 IN

NY GW-02 IN

NY GW-03 IN

NY GW-04 IN

NY GW-05 IN

NY GW-06 IN

NY GW-07 IN

NY GW-08 IN

NY GW-09 IN

NY GW-10 IN

NY MON-01

NY MON-02

NY MON-03

NY MON-04

NY MON-05

NY MON-06

LA CAM-05

NY GW-01 OUT

LA CAM-06

LA CAM-07

LA CAM-06

NY MV-01 PIP01

NY MV-01 PIP02

NY MV-01 PIP03

NY MV-01 PIP04

NY MV-01 PIP05

NY MV-01 PIP06

LIVE FEED 01

NY MV-01 PIP07

NY MV-01 PIP08

NY MV-01 PIP09

NY MV-01 PIP10

NY MV-01 PIP11

NY MV-01 PIP12

Grid 5

Connect

DisGrid 17

Search source

Text input 31

COMM BOOTH

INTVW SET

LA CAM-01

LA CAM-02

LA CAM-03

LA CAM-04

LA CAM-05

LA CAM-06

LA CAM-07

LA CAM-08

LA CAM-09

LA CAM-10

LA FW-01 OUT

LA MIC-01

LA MIC-02

LA MIC-03

LA MIC-04

LA MIC-05

LA MIC-06

LA MIC-07

LA MIC-08

LA MIC-09

LA MIC-10

LA MIC-11

LA MIC-12

LA MIC-13

LA MIC-14

LA MIC-15

LIVE FEED 01

LIVE FEED 02

LIVE FEED 03

LIVE FEED 04

NWS STUDIO FEED

NY AUDPRX-01 OUT

NY AUDPRX-02 OUT

NY AUDPRX-03 OUT

Grid 3

DATA

LAYOUT

SETTINGS

Search

DATA USED IN PAGE/PANEL

Disconnect Button

Connect Button

Sources

Destinations

ALL AVAILABLE DATA

QUERIES (13)

Search

Connect Button

Disconnect Button

Toggle Lock Button

Source Levels

Destination Levels

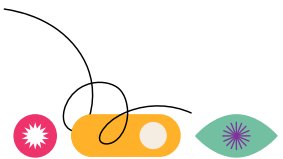
Sources

Destinations

Source Areas

Destination Areas

Source Domains

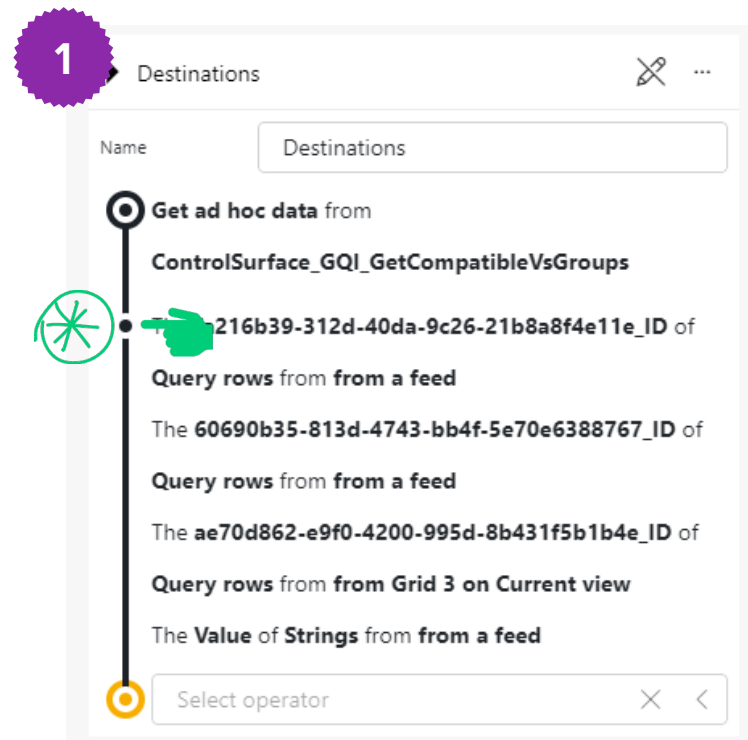


Control Surface

Tweak the lay-out of the control surface

exercise

- Open the second step of the query
- In the 'Search Filter' box, type 'NY MV'
- The destination buttons will be filtered to only show those containing 'NY MV')



1

Destinations

Name Destinations

Get ad hoc data from

ControlSurface_GQI_GetCompatibleVsGroups

216b39-312d-40da-9c26-21b8a8f4e11e_ID of

Query rows from from a feed

The 60690b35-813d-4743-bb4f-5e70e6388767_ID of

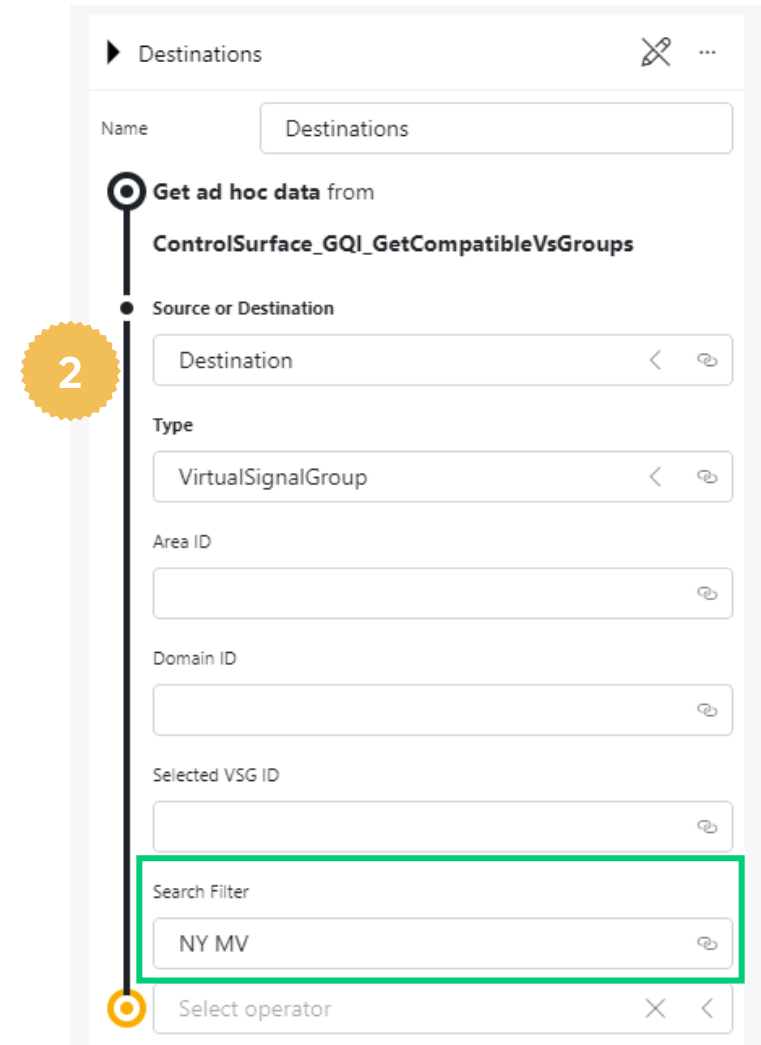
Query rows from from a feed

The ae70d862-e9f0-4200-995d-8b431f5b1b4e_ID of

Query rows from from Grid 3 on Current view

The Value of Strings from from a feed

Select operator



2

Destinations

Name Destinations

Get ad hoc data from

ControlSurface_GQI_GetCompatibleVsGroups

Source or Destination

Destination

Type

VirtualSignalGroup

Area ID

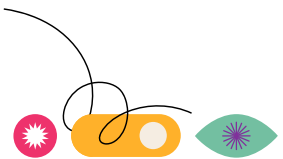
Domain ID

Selected VSG ID

Search Filter

NY MV

Select operator

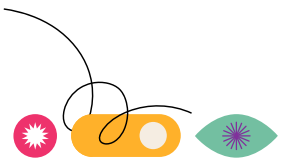
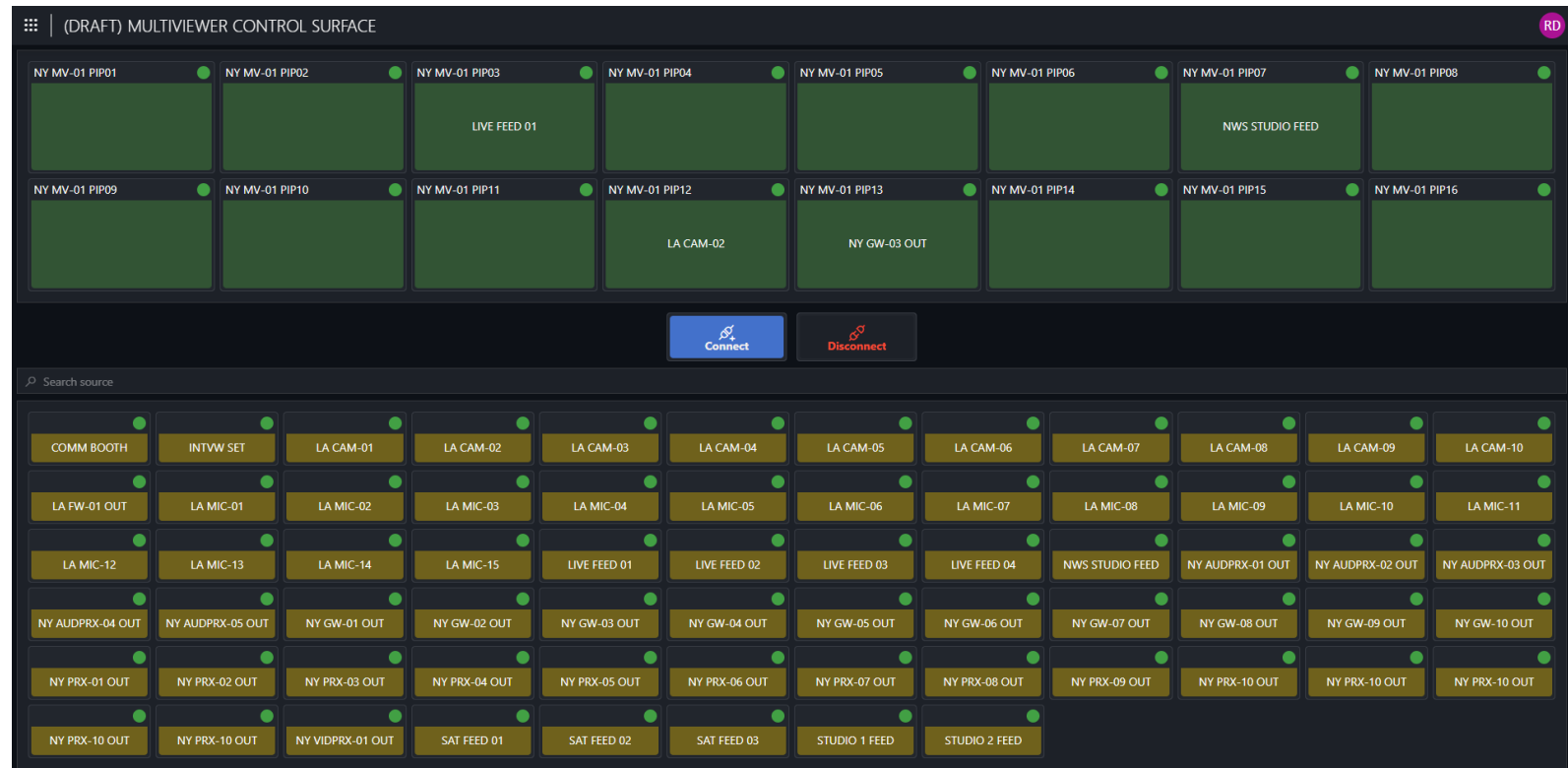


Control Surface

Tweak the lay-out of the control surface



- Tweak the size of your two button grids
- Select the component, and under component 'layout' > 'advanced' change the number of rows and columns of the grid, for example
 - For the destinations: 8x2
 - For the sources: 12x6
- You can tweak this if need, depending on the resolution of your screen
- Publish your app to verify its functionality



Control Surface

Tweak the lay-out of the control surface

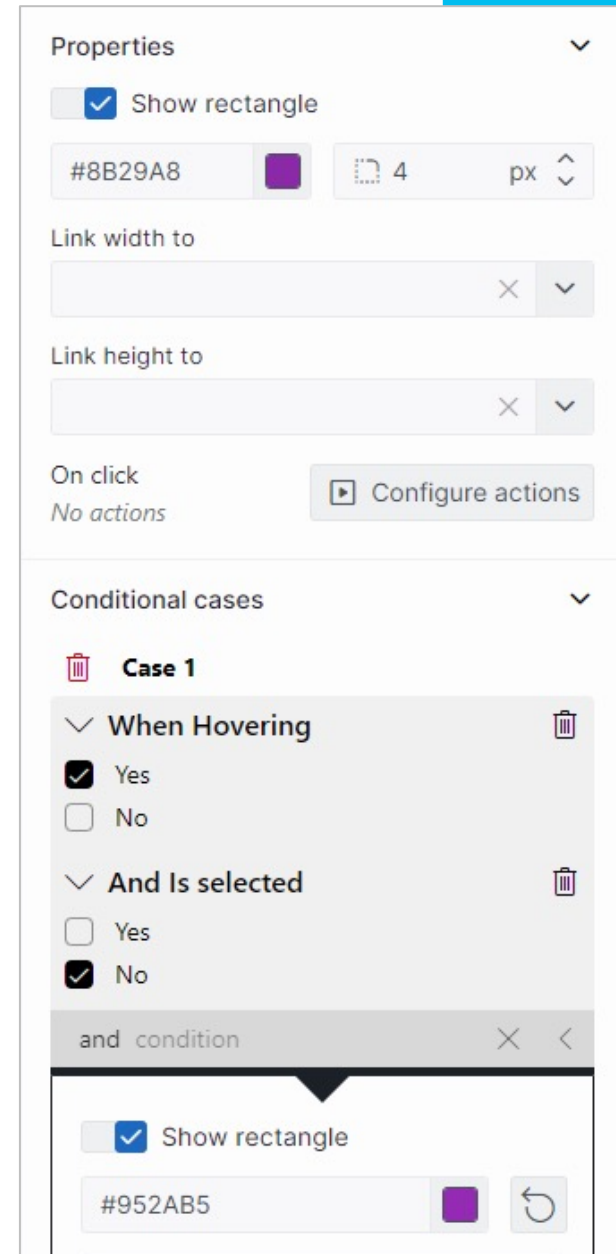
- Let's pimp the colors of the control surface buttons
- Select the component > Layout > Item templates > Edit
- Select the third (rectangle) layer from the bottom
- Change the colors in
 - The base state (default)
 - Case 1: hovering
 - Case 2: selected
- For example:

Sources

Default:  (#00BFEF)
Hovering:  (#26C9F1)
Selected:  (#43D8FF)


Destinations

Default:  (#8B29A8)
Hovering:  (#952AB5)
Selected:  (#B63ED9)



Properties

Show rectangle


#8B29A8  4 px


Link width to

Link height to


On click
No actions Configure actions

Conditional cases

 **Case 1**

When Hovering 



Yes
 No

And Is selected 

Yes
 No

and condition × <

Show rectangle

#952AB5  

Control Surface

Tweak the lay-out of the control surface

exercise

(DRAFT) MULTIVIEWER CONTROL SURFACE RD

NY MV-01 PIP01	NY MV-01 PIP02	NY MV-01 PIP03	NY MV-01 PIP04	NY MV-01 PIP05	NY MV-01 PIP06	NY MV-01 PIP07	NY MV-01 PIP08
		LIVE FEED 01				NWS STUDIO FEED	
NY MV-01 PIP09	NY MV-01 PIP10	NY MV-01 PIP11	NY MV-01 PIP12	NY MV-01 PIP13	NY MV-01 PIP14	NY MV-01 PIP15	NY MV-01 PIP16
			LA CAM-02	NY GW-03 OUT	LA MIC-03		

Connect Disconnect

Search source

COMM BOOTH	INTVW SET	LA CAM-01	LA CAM-02	LA CAM-03	LA CAM-04	LA CAM-05	LA CAM-06	LA CAM-07	LA CAM-08	LA CAM-09	LA CAM-10
LA FW-01 OUT	LA MIC-01	LA MIC-02	LA MIC-03	LA MIC-04	LA MIC-05	LA MIC-06	LA MIC-07	LA MIC-08	LA MIC-09	LA MIC-10	LA MIC-11
LA MIC-12	LA MIC-13	LA MIC-14	LA MIC-15	LIVE FEED 01	LIVE FEED 02	LIVE FEED 03	LIVE FEED 04	NWS STUDIO FEED	NY AUDPRX-01 OUT	NY AUDPRX-02 OUT	NY AUDPRX-03 OUT
NY AUDPRX-04 OUT	NY AUDPRX-05 OUT	NY GW-01 OUT	NY GW-02 OUT	NY GW-03 OUT	NY GW-04 OUT	NY GW-05 OUT	NY GW-06 OUT	NY GW-07 OUT	NY GW-08 OUT	NY GW-09 OUT	NY GW-10 OUT
NY PRX-01 OUT	NY PRX-02 OUT	NY PRX-03 OUT	NY PRX-04 OUT	NY PRX-05 OUT	NY PRX-06 OUT	NY PRX-07 OUT	NY PRX-08 OUT	NY PRX-09 OUT	NY PRX-10 OUT	NY PRX-10 OUT	NY PRX-10 OUT
NY PRX-10 OUT	NY PRX-10 OUT	NY VIDPRX-01 OUT	SAT FEED 01	SAT FEED 02	SAT FEED 03	STUDIO 1 FEED	STUDIO 2 FEED				



Control Surface

Tweak the behavior of the control surface

exercise

- Next to its lay-out, we can also change the behavior of the control surface as needed
- In this example, we'll let the user select one of the multiviewer destinations and connect it to a source simply by clicking the source button

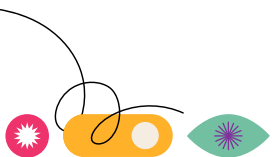


Control Surface

Tweak the behavior of the control surface

exercise

- Delete the connect and disconnect button
- Fill the freed up space by increasing the size of the source and/or destination button grids
- Open the template editor on the sources grid component
- Add a transparent rectangle layer on top of the template, covering the entire button
- Add an 'on click' action to this layer that executes the same automation script as the connect button on the default control surface ('ControlSurface_Take')
- Configure the following parameters on the script (see also next slide)
 - Action: ["Connect"]
 - Destinations: link this to ID of the destination selected in the destination buttons grid
 - Levels: [] (will connect all matching levels from source & destination)
 - Source: link this to ID of the source selected in the source buttons grid



Control Surface

Tweak the behavior of the control surface

Dimensions

↔ 140 px ↑ 65 px

⏏ ⏏

⏏ ⏏

⏏ ⏏

⏏ ⏏

Properties

Show rectangle

rgba(0,0,0,0) 0 px

Link width to

Link height to

On click
1 action

▶ Configure actions

What should happen when this shape is clicked?

Launch 'ControlSurface_Take'

Launch a script

ControlSurface_Take

PARAMETERS

Action ["Connect"]

Destinations

Levels []

Source

Show settings

+ Upon completion

Copy actions Add action **Ok**

Link to

Feed
Buttons / Grid 5

Type
Object manager instances

Property
ID

Cancel **Apply**

Link to

Feed
Buttons / Grid 3

Type
Object manager instances

Property
ID

Cancel **Apply**



Control Surface

Tweak the behavior of the control surface

exercise

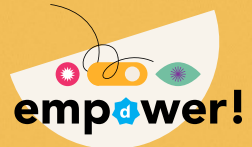
For those who want some further challenges:

- Tweak the visualization of the source buttons
- Add a disconnect button to the destinations that is only visible when the destination is effectively connected to a source, and that disconnects the destination on click

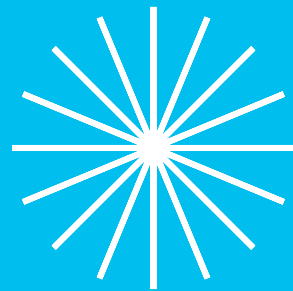


ASK AWAY

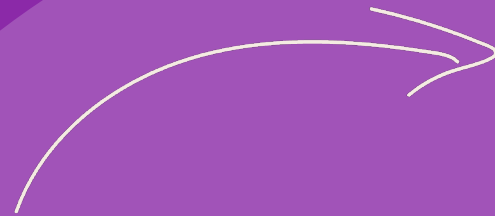
Questions?



Hardening your DataMiner system



YOUR HOST



Sepp Dejonckheere

Senior Information Security Analyst



TEAM.SECURITY@SKYLINE.BE

VISUAL OVERVIEW
DASHBOARDS
LOW-CODE APPS
GQI

Agenda



1. Default DataMiner configuration

⊗ HTTP(S)

⊗ NATS

⊗ RPC protocol

⊗ Firewall rules

2. Setup specific configuration

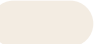
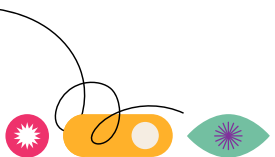
⊗ End-Of-Life components

⊗ Firewall rules

⊗ TLS version configuration

⊗ Database configuration

3. Detecting and solving issues



Default DataMiner configuration

"That's just the way it is"

The way it is ~ Bruce Hornsby & The Range



DataMiner Hardening

Default DataMiner configuration



HTTP enabled
Best effort HTTPS
HTTP headers



Cube and DMA communication
Inter-DMA communication



Plaintext communication



Potential unnecessary open ports



IIS DataMiner Hardening

HTTP(S)

⊗ HTTP

Enabled by default

⊗ HTTPS

Best effort

⊗ HTTP Headers

Disable HTTP completely

Redirect HTTP to HTTPS

Make HTTP localhost only

Self-signed certificate

Hostname as FQDN



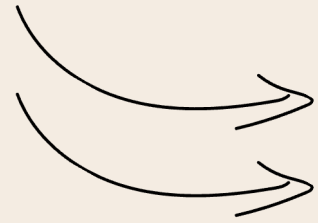


DataMiner Hardening

NATS

⊗ Unencrypted communication

mm



Not an issue for standalone Agents

Issue for Clusters and external DxMs



Work in progress to have TLS enabled by default





DataMiner Hardening

RPC protocol

⊗ Switch .NET Remoting to gRPC



MaintenanceSettings
or
Redirects in DMS.xml

→ gRPC will become the default





DataMiner Hardening

Firewall rules

⊗ Port 8004: .NET Remoting -----> unnecessary when using gRPC

⊗ Ports 7000 and 9042: Cassandra

⊗ Ports 9200 and 9300: ElasticSearch

Only required for local nodes

⊗ Ports 4222, 8222 and 9090: NATS

Only required for Clusters and external DxMs

⊗ 'Allow ICMP' rule

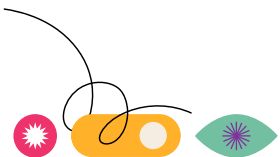
Only required for Failover heartbeats and pingCount



Setup specific configuration

"You can go your own way"

Go your own way ~ Fleetwood Mac



DataMiner Hardening

Setup specific configuration



Usage of end-of-life components



Legacy firewall rules



TLS version configuration
Local Administrator



Database connection TLS
Database authentication





DataMiner Hardening

End-Of-Life components

⊗ Annotations module → no replacement

Disabled by default since 10.4
Can be enabled via softlaunch flag

⊗ Legacy Reports and Dashboard module →



⊗ Legacy v0 API → replaced by v1 API

Disabled by default since 10.1.6/10.2.0
Can be enabled in web.config when not cloud connected





DataMiner Hardening

Legacy firewall rules

⊗ Port 23: Telnet → For Element debugging, use Stream Viewer instead

⊗ Port 9004: Web services → No longer required

⊗ Port 8222 : NATS → exposes debugging info

⊗ Ports 161 and 362 (SNMP)

→ Only required for SNMP Agent functionality

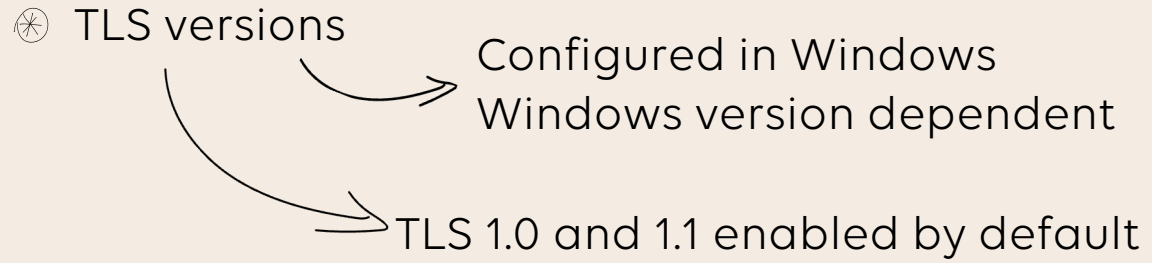
⊗ 'Allow remote Administration' rule

→ Only when monitoring Agent by Microsoft Platform element



OS DataMiner Hardening

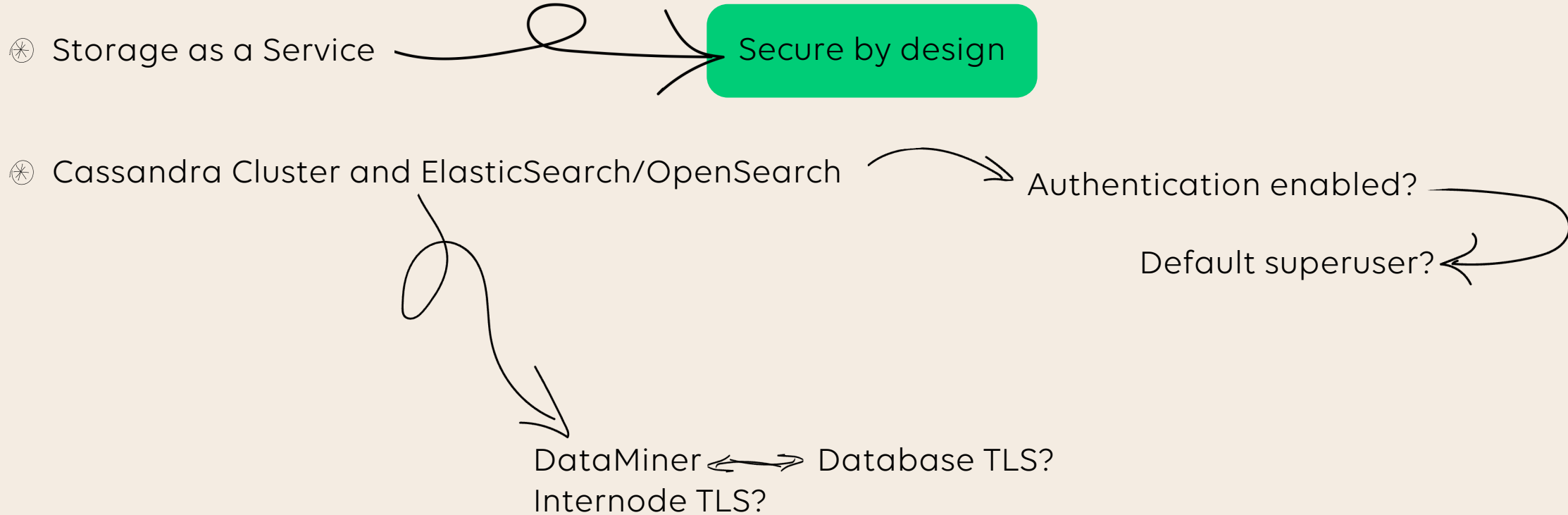
TLS version configuration





DataMiner Hardening

Database configuration



Detecting and solving issues

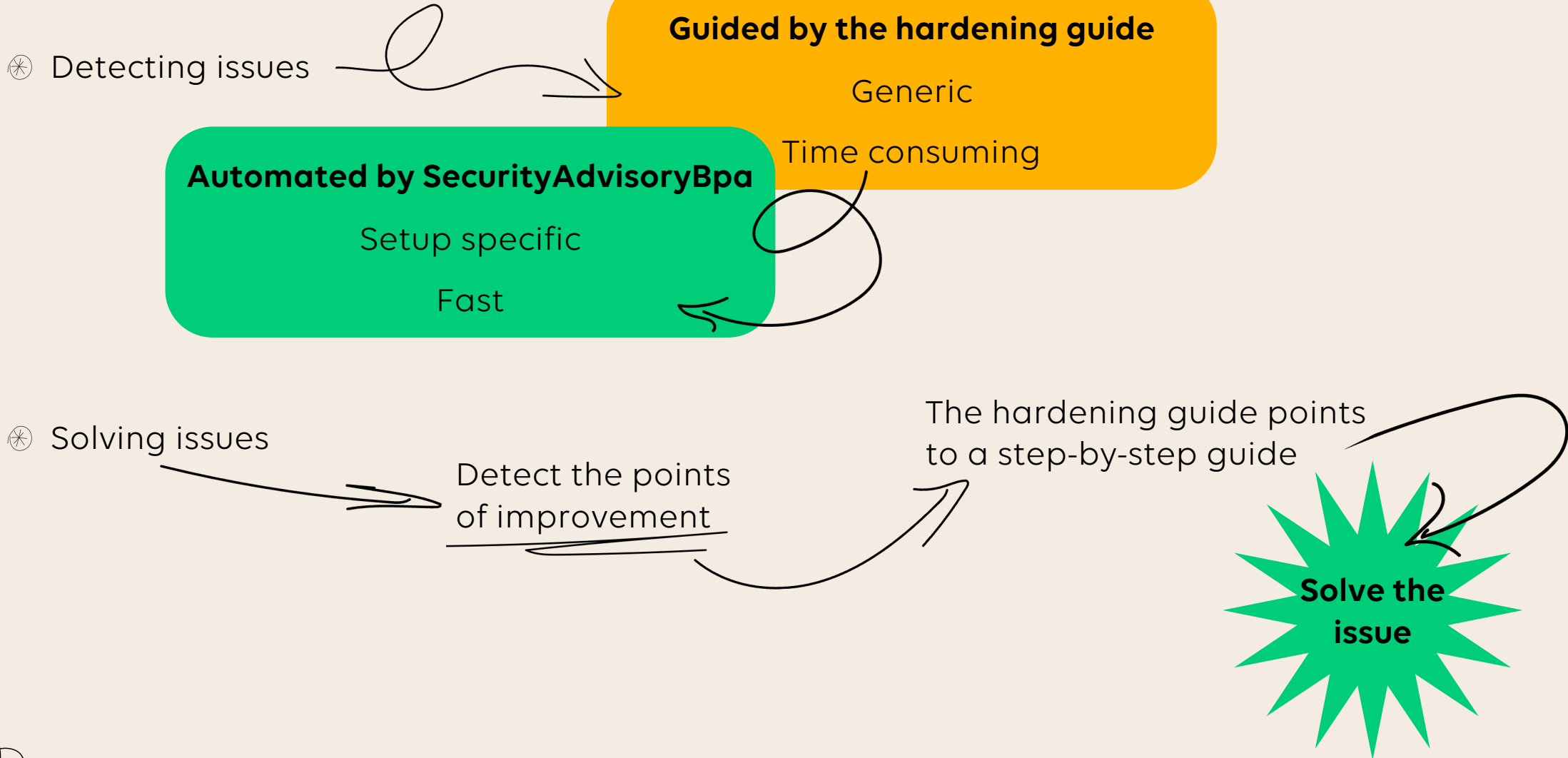
"I will take you on"

Get it together ~ De Staat



DataMiner Hardening

Detecting and solving issues



GET INSPIRED



Let's have

 a look



GET INSPIRED

ASK AWAY

Questions?

