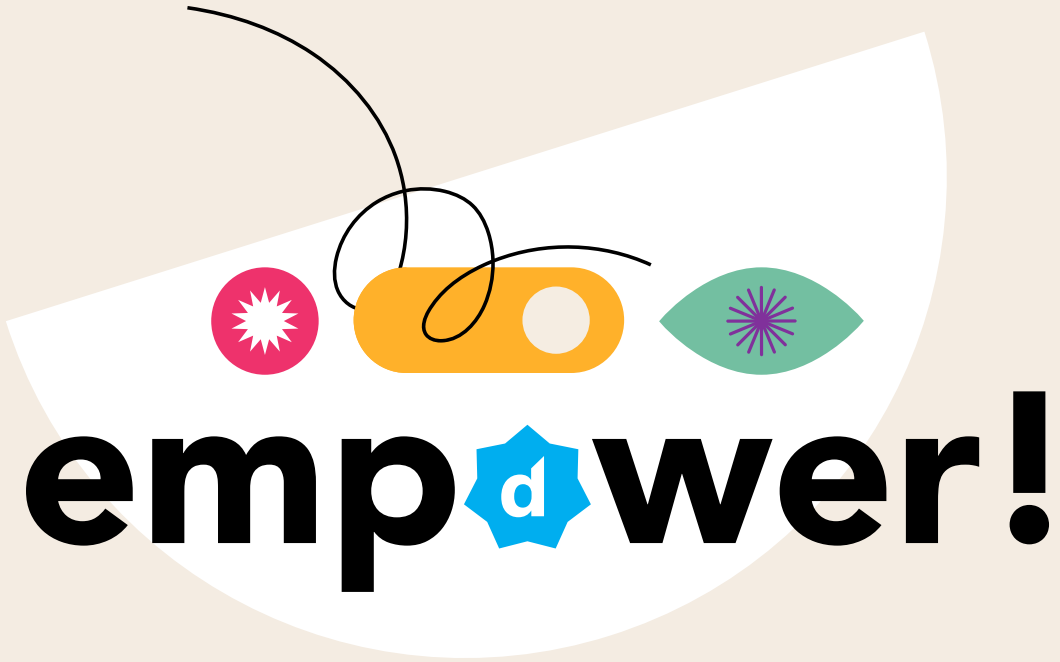
empowerd!

Welcome

empower!

Discover the power of DataMiner Object Models

DATAMINER OBJECT MODELLING

YOUR HOST

Thomas Ghysbrecht

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YOUR HOST

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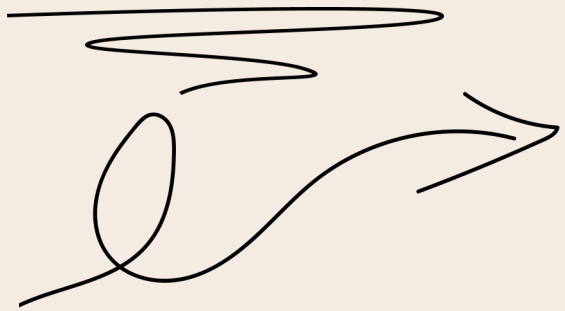
WHAT'S ON THE MENU

Agenda



1. Introduction 15 min
   - What is DataMiner Object Models (DOM)?
   - Options to create a model

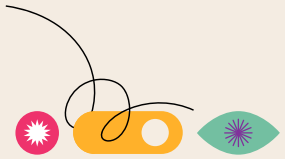
2. Hands-on - Create a model from scratch 35 min

3. **30 min break**

4. Status system 15 min
   - Configuration walkthrough

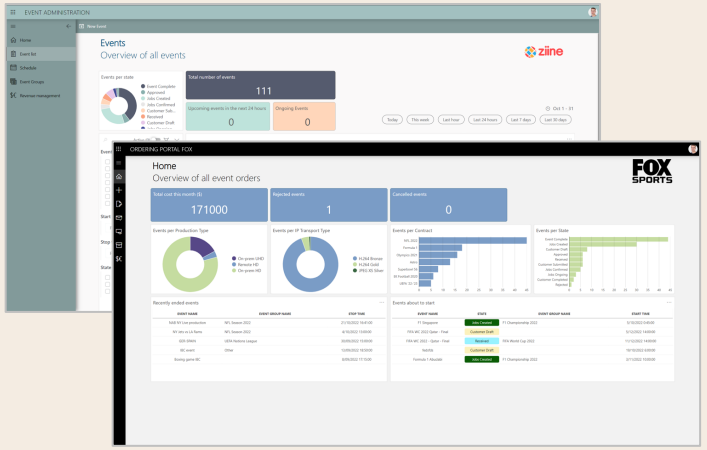
5. Good to know 15 min
   - Best practices
   - What's new since last Empower?
   - DOM in the DataMiner docs

6. Hands-on - Extend our DOM model 20min

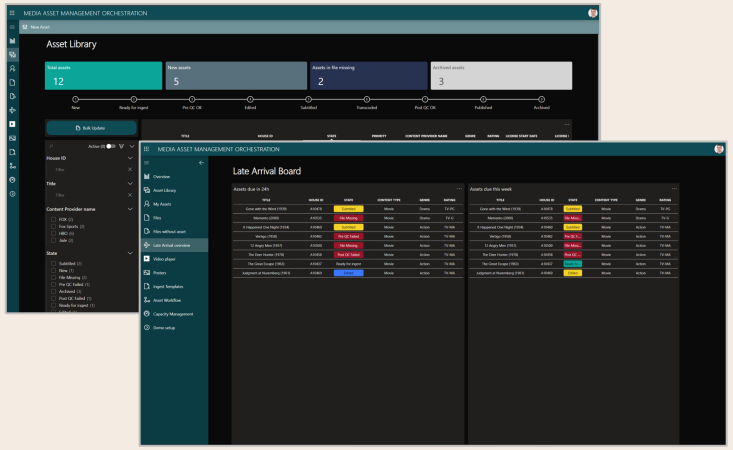


DataMiner Object Models (DOM)

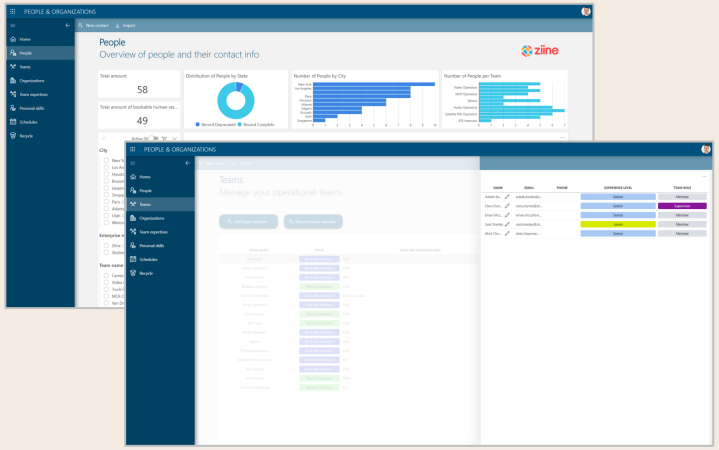
Enrich your operation with just any administrative data



- 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

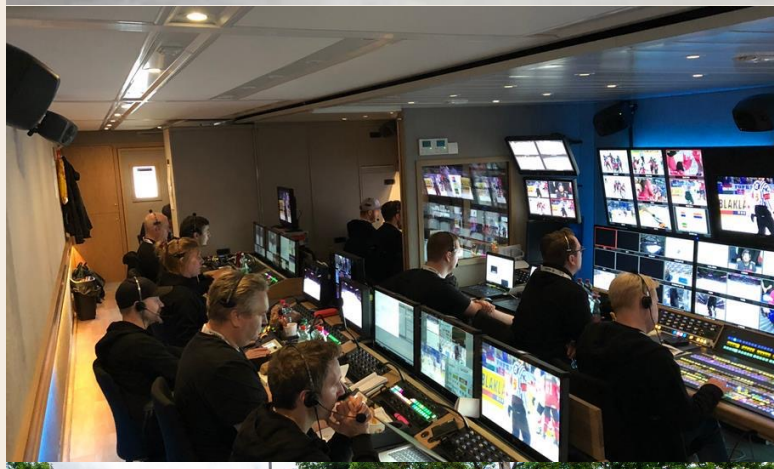
HD and 1 other option

Size

Medium

Number Of Cameras

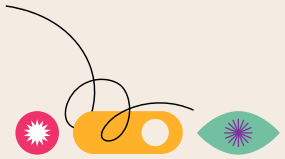
12



DOM - Introduction

The 4 core DOM objects

1. Module Settings
2. Section Definitions
   (with FieldDescriptors)
3. DOM Definitions
4. DOM Instances



DOM - Introduction

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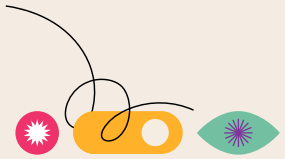
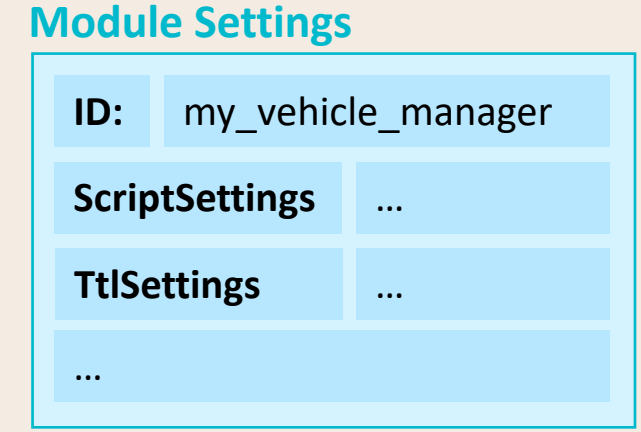


DOM - Introduction

1. Module Settings

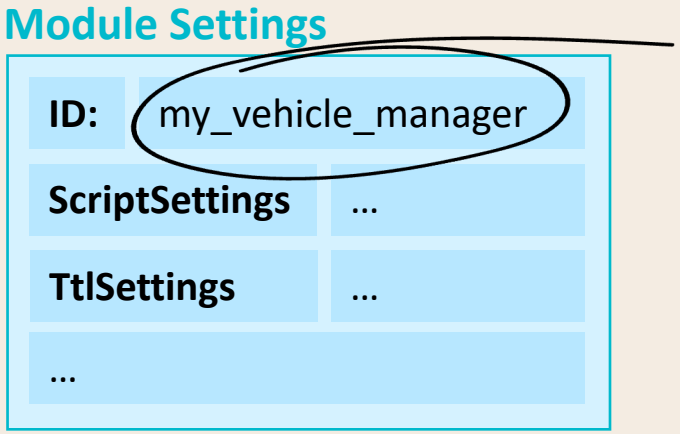
- **Defines cross-model settings and forms a logical grouping of DOM models.**
- Setting types:
  - Script settings (CRUD scripts)
  - Time-to-live of data (TTL)
  - History settings
  - Storage settings
  - …
- Advanced use, defaults are fine in most cases



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**



DOM - Introduction

The 4 core DOM objects

1. Module Settings
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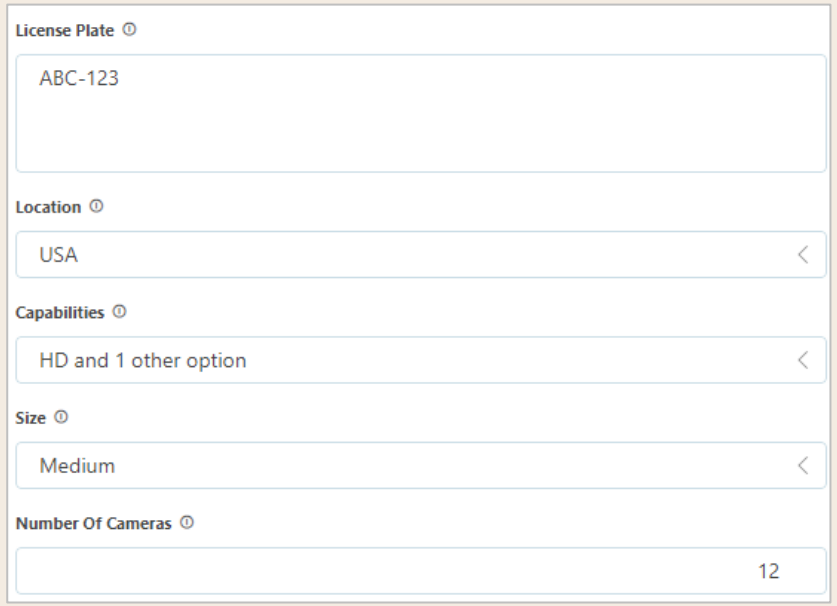
3. DOM Definitions
4. DOM Instances

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.



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

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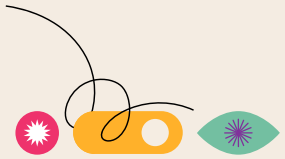
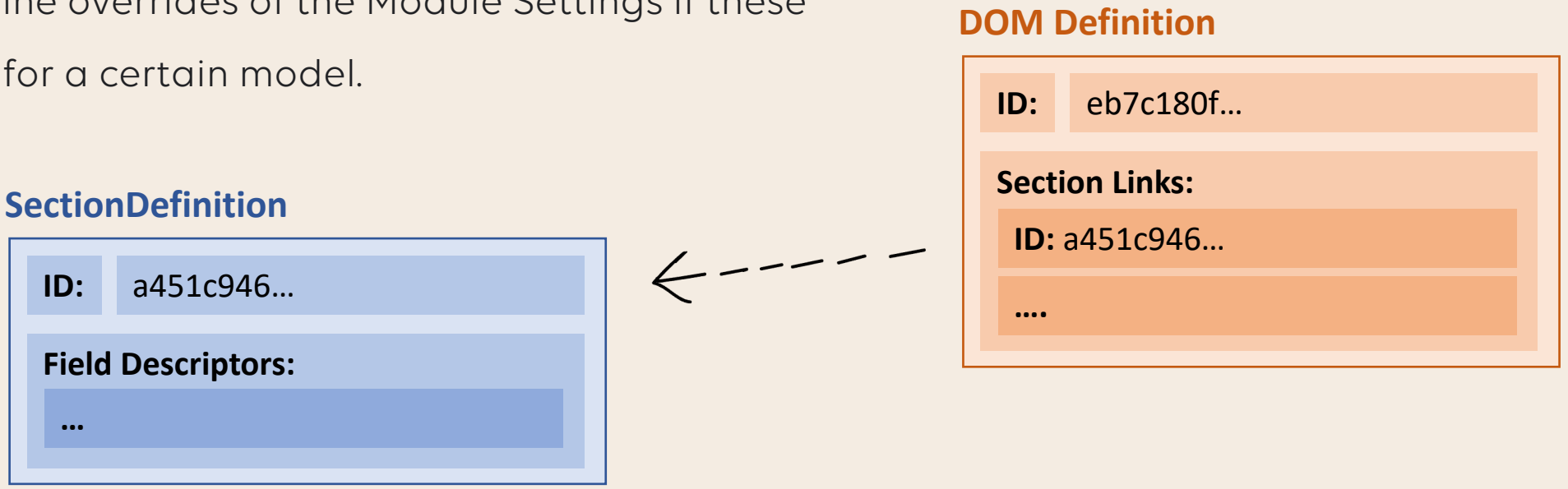


DOM - Introduction

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.



DOM - Introduction

The 4 core DOM objects

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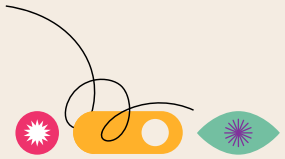
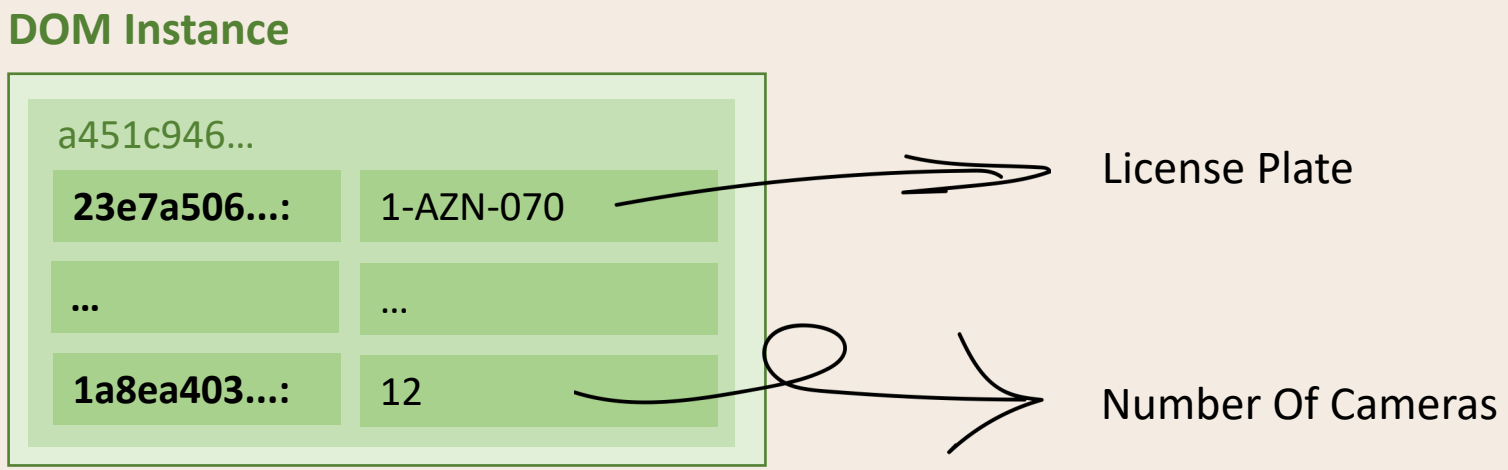


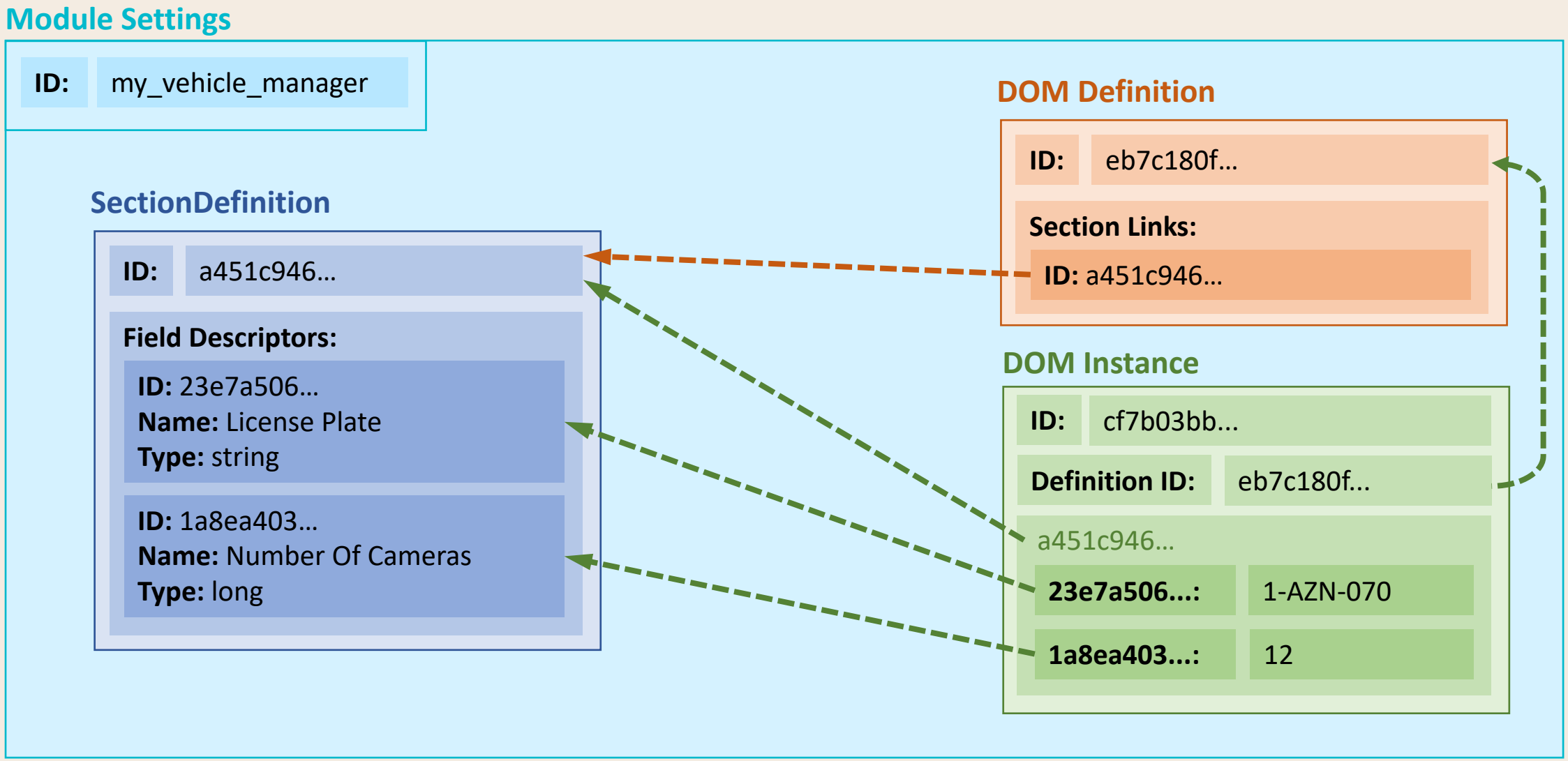
DOM - Introduction

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 - Introduction



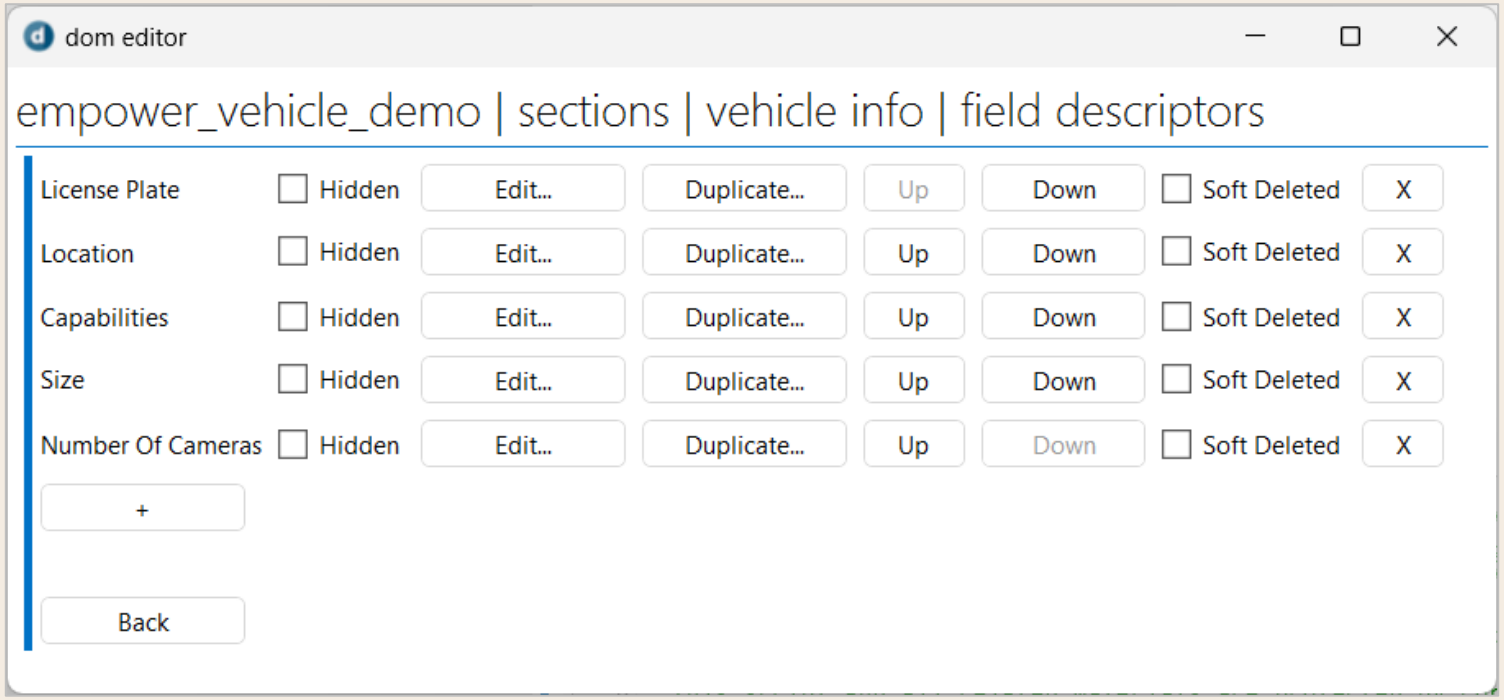
Creating the model

- **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

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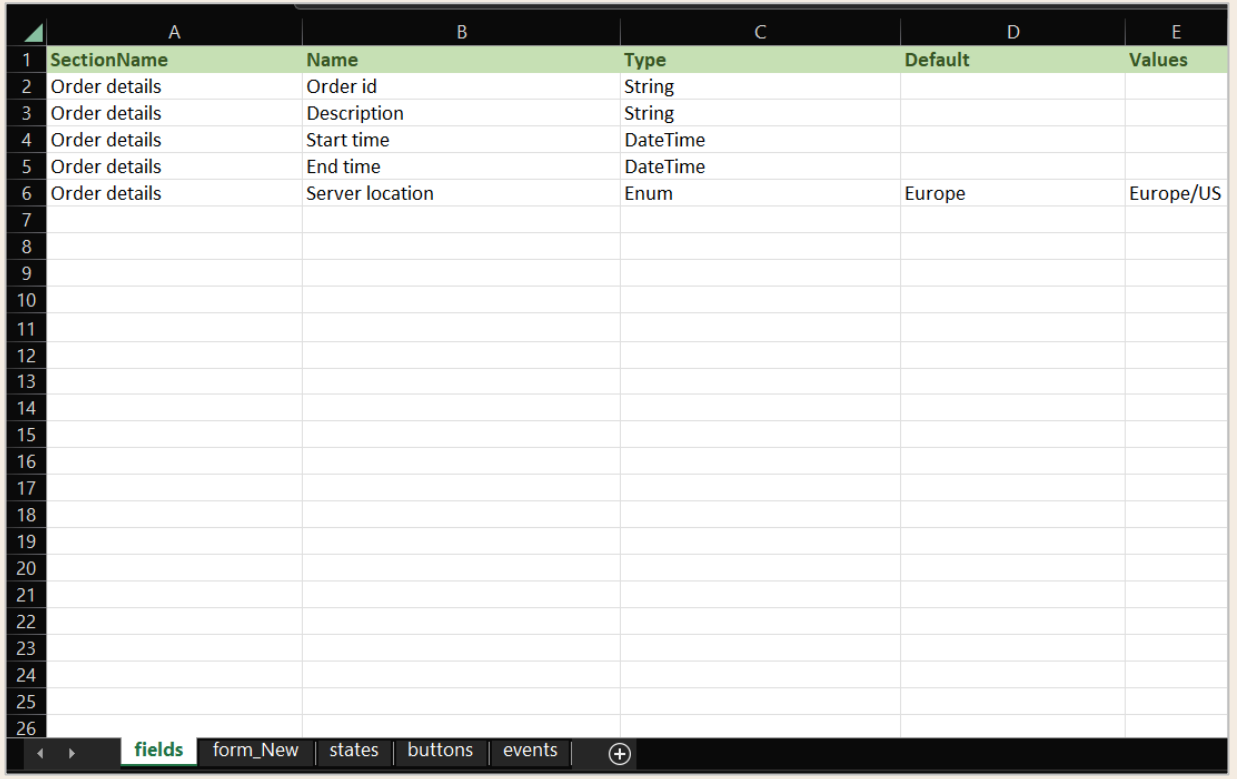


	A	B	C	D	E
1	SectionName	Name	Type	Default	Values
2	Order details	Order id	String		
3	Order details	Description	String		
4	Order details	Start time	DateTime		
5	Order details	End time	DateTime		
6	Order details	Server location	Enum	Europe	Europe/US

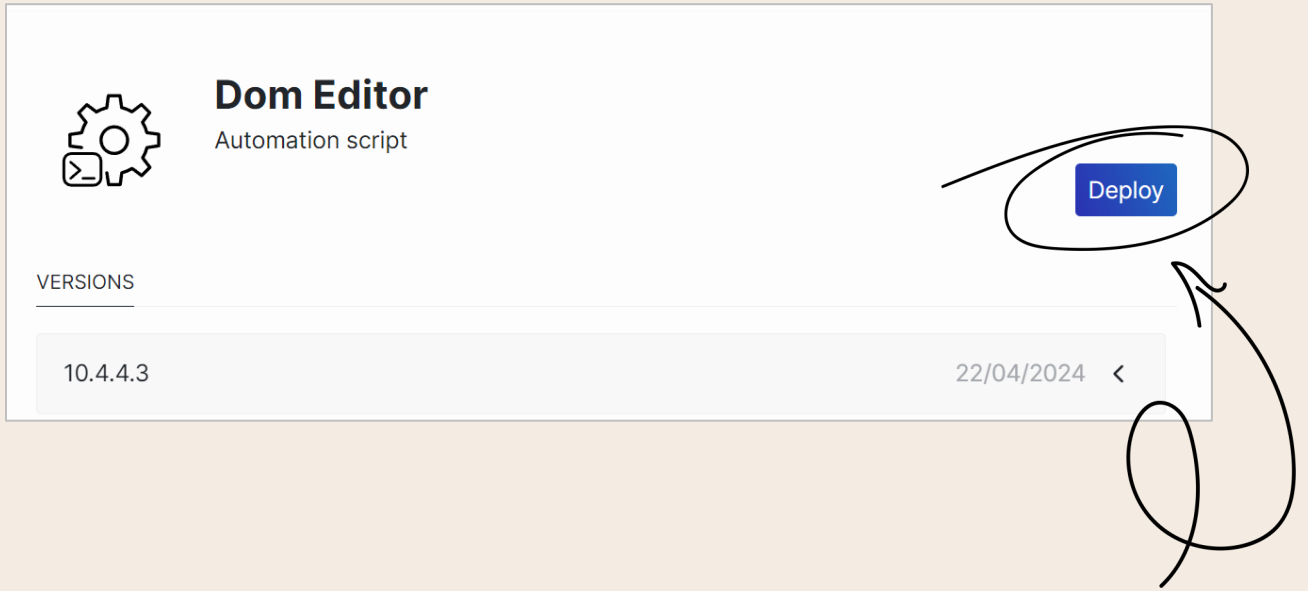
fields | form_New | states | buttons | events

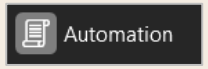
Hands-on

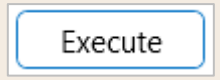
DOM - Hands-on

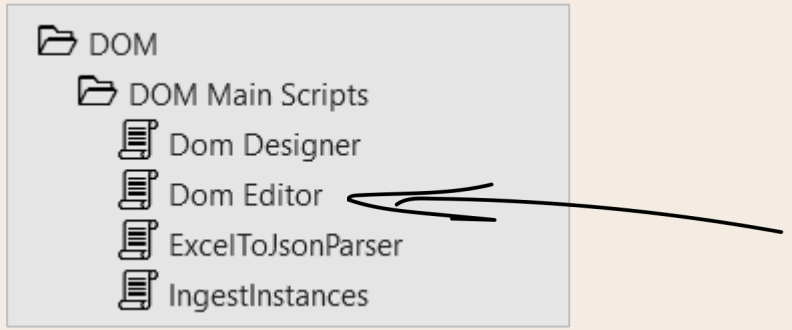
Create our DOM model using the DOM editor

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 

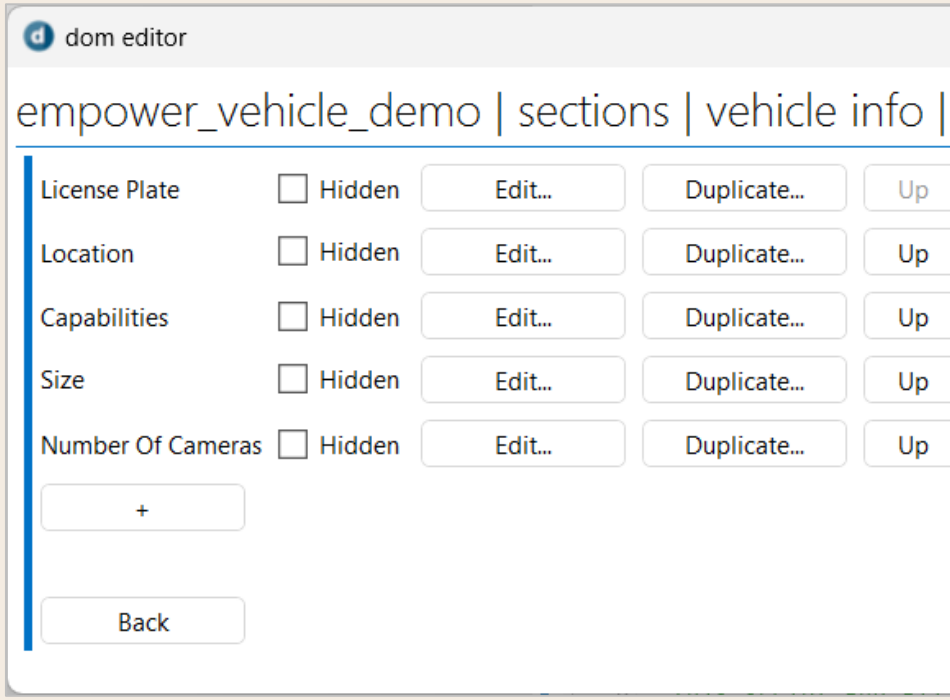
6. Execute the 'Dom Editor' script 



DOM - Hands-on

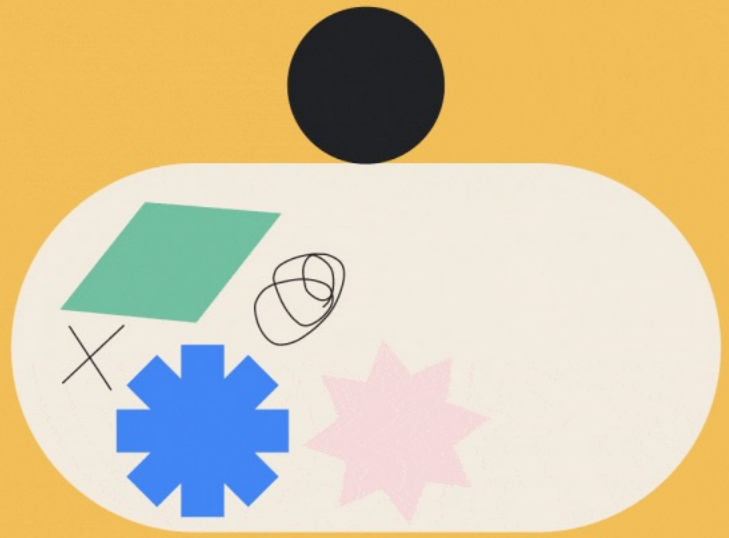
Create our DOM model using the DOM editor

- 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



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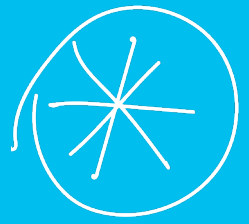


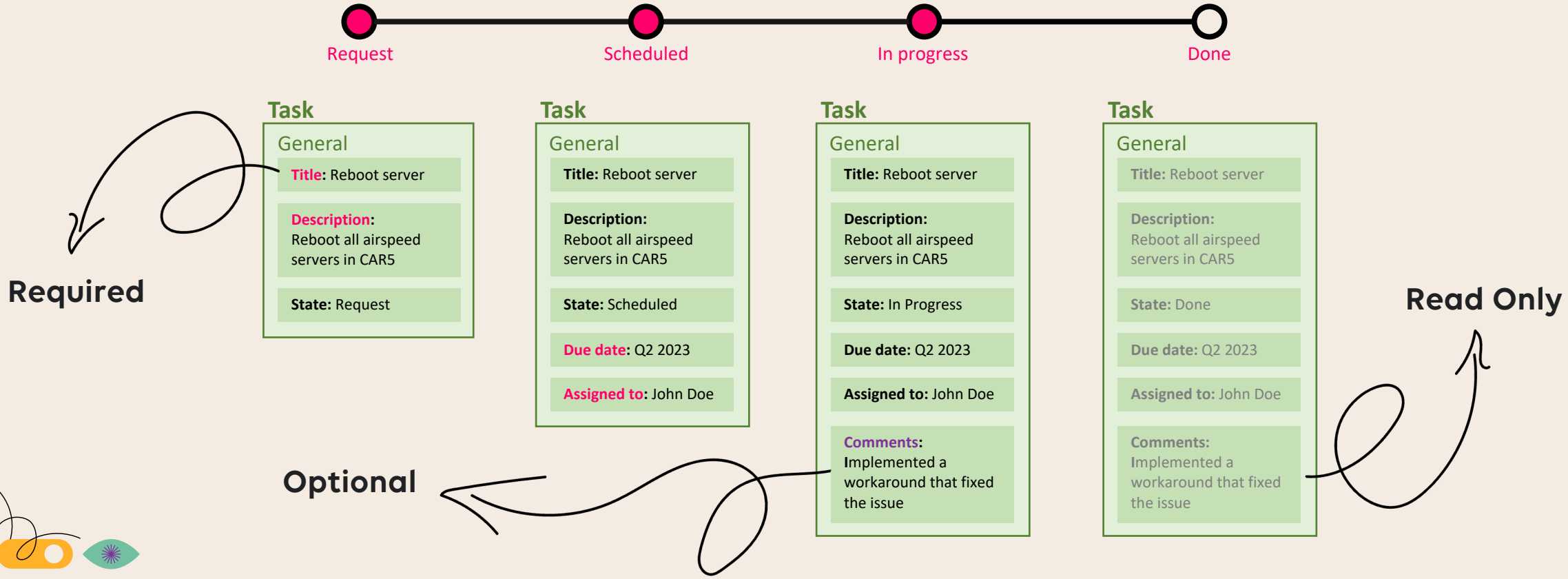
Status System

DATAMINER OBJECT MODELLING

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

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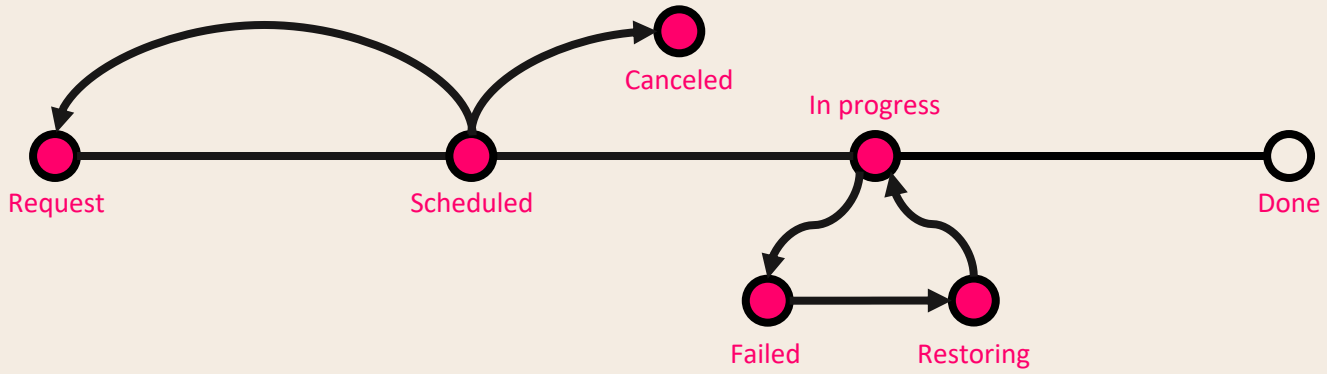
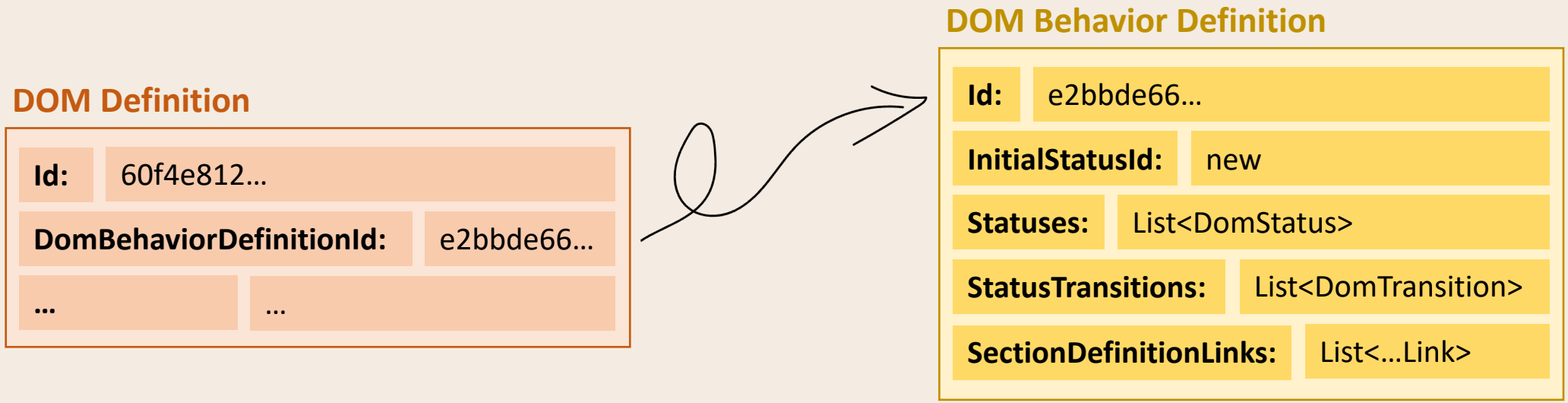
- Allows you to assign a state to a DOM instance, transition between these state and put conditions on whether fields should be required, read-only, hidden etc. for each state.



DOM - Status System

Configuring the status system

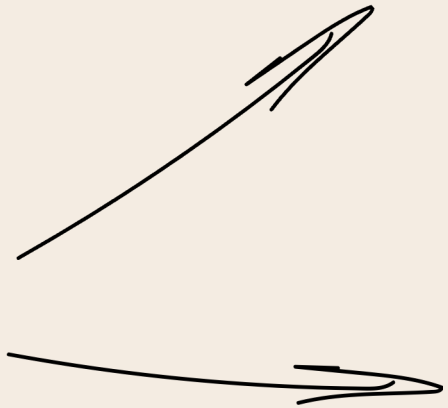


DOM - Status System

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:	DomStatusSectionDefinitionLinkId
FieldDescriptorLinks:	List<…Link>

DOM Status Section Definition Link ID

Status ID:	new
SectionDefinitionId:	e7af7667…

DOM Status Field Descriptor Link

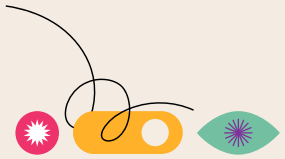
FieldDescriptorId:	36aff51b…
Visible:	true
RequiredForState:	true
ReadOnly:	false
ClientReadOnly:	false

DOM - Status 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)**

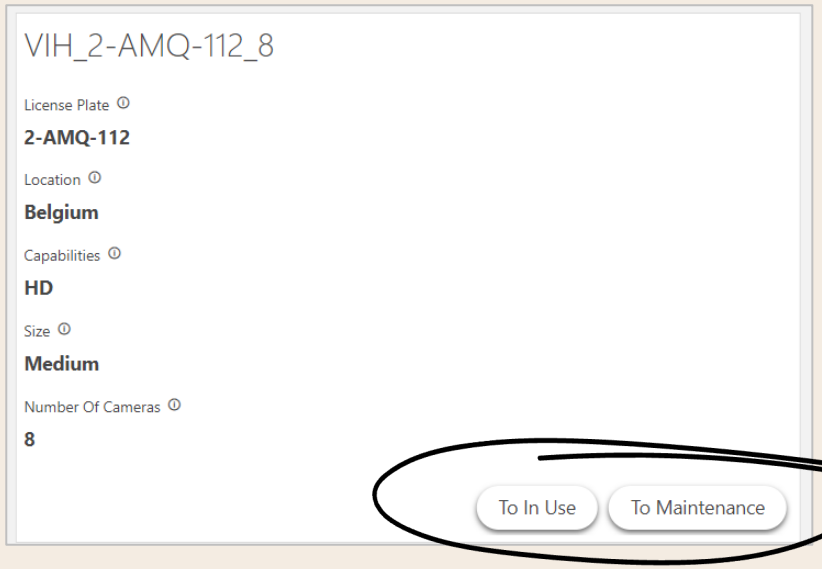
*** Only applies to the UI and not the DOM API**



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.




```
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

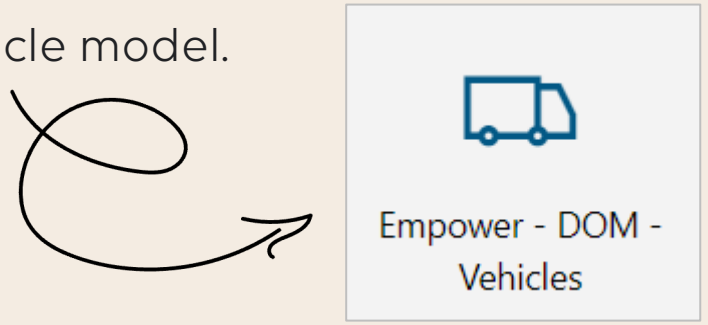
DATAMINER OBJECT MODELLING

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.



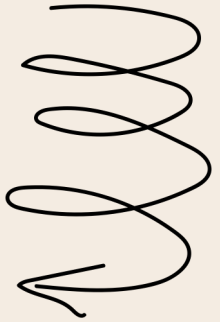
Best Practices

DATAMINER OBJECT MODELLING

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.

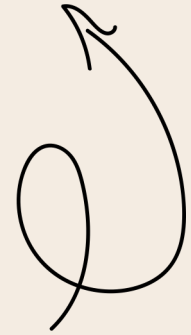
Not recommended:

- 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

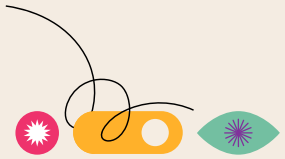
Note:
Less relevant on STaaS due to how the data is stored.



DOM - Best Practices

2. Disable instance history

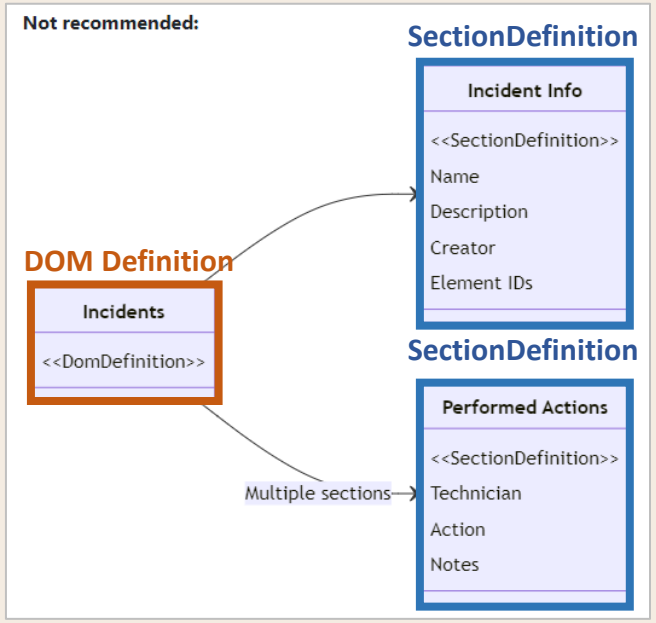
- By default, **any change** made to a DOM instance **is tracked** in a history record.
- Disabling the history **reduces the load on the system and database**.
- Especially important for DOM manager that see **frequent DOM instance updates**.
- Can be disabled on **module or DOM definition level**.

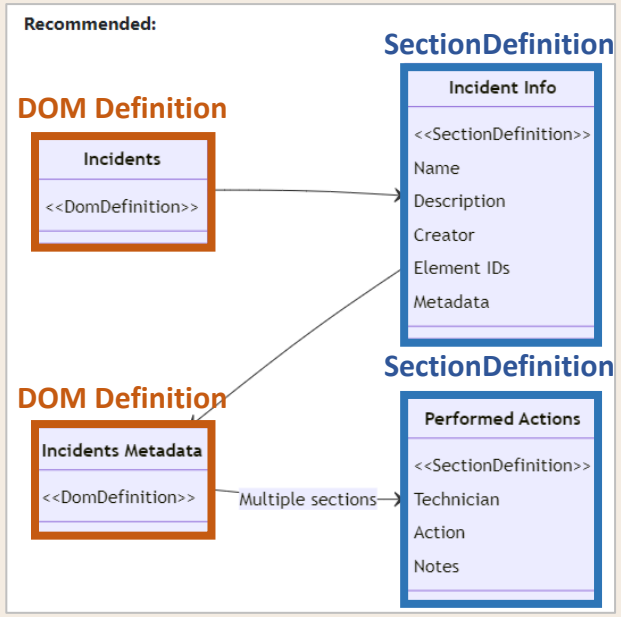


DOM - Best Practices

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?

DATAMINER OBJECT MODELLING

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		Create 100 **large** DOM instances	
One-by-one	*In bulk*	*One-by-one*	*In bulk*
7,090 ms	**285 ms**	**9,220 ms**	**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

Before	*Now*
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?

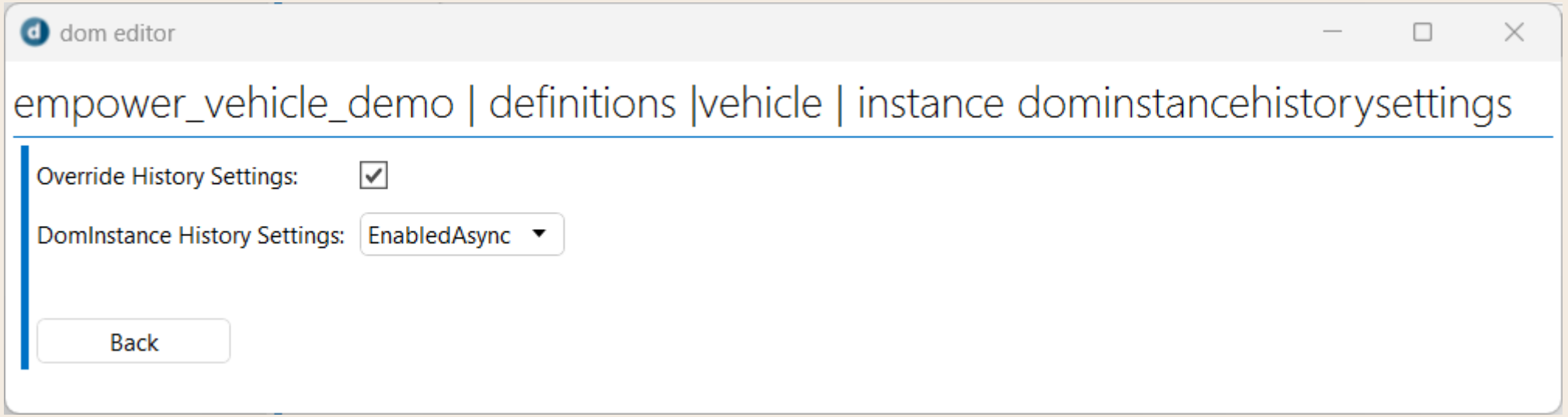
3. Soft-deletion of links and field descriptors

- 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

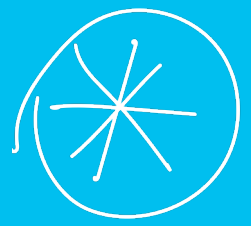
DATAMINER OBJECT MODELLING

DOM - DataMiner Docs

Expand your DOM knowledge with the DataMiner Docs

- The DataMiner Docs contains nearly everything there is to learn of DOM.
- Getting started with DOM steps.
- Code examples
- Tutorials

https://aka.dataminer.services/DOM



Hands-on

Extend our model

DOM - Hands-on

Expand our DOM model using the DOM editor

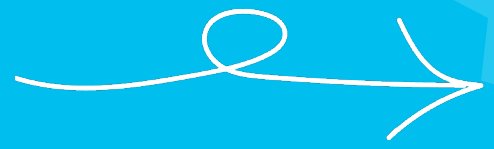
- **Goal:** Add another definition called '**Damage Reports**' that could be used to keep track of accidents. Use a **DOM instance field** to link these to vehicles.
- Fields:
  - **Vehicle** - DOM Instance Reference
  - **Date** - DateTime field
  - **Description** - Text field
  - **Driver** - User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

ASK AWAY

empower!

Explore Chat Integration & Custom Commands

Elevate your Teams with ChatOps!



YOUR HOST

Baptiste Pattyn

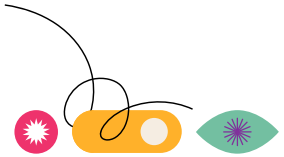
PRODUCT OWNER CLOUD

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

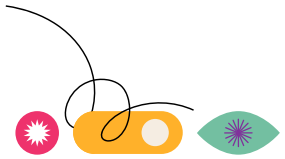
Understand the different parts of ChatOps

Familiarize with Custom Commands and Chat Integration

Hands-on experience with the DataMiner Bot

Configure and Adjust Automation Scripts

Have fun!

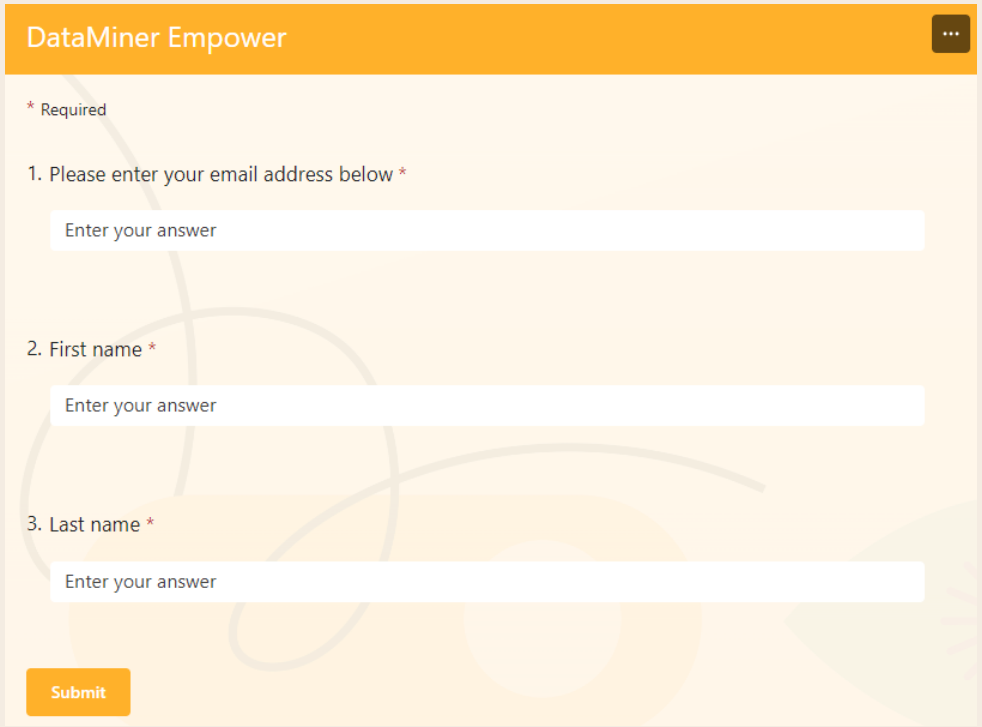


Access Empower Tenant

https://aka.dataminer.services/empower

Registration form

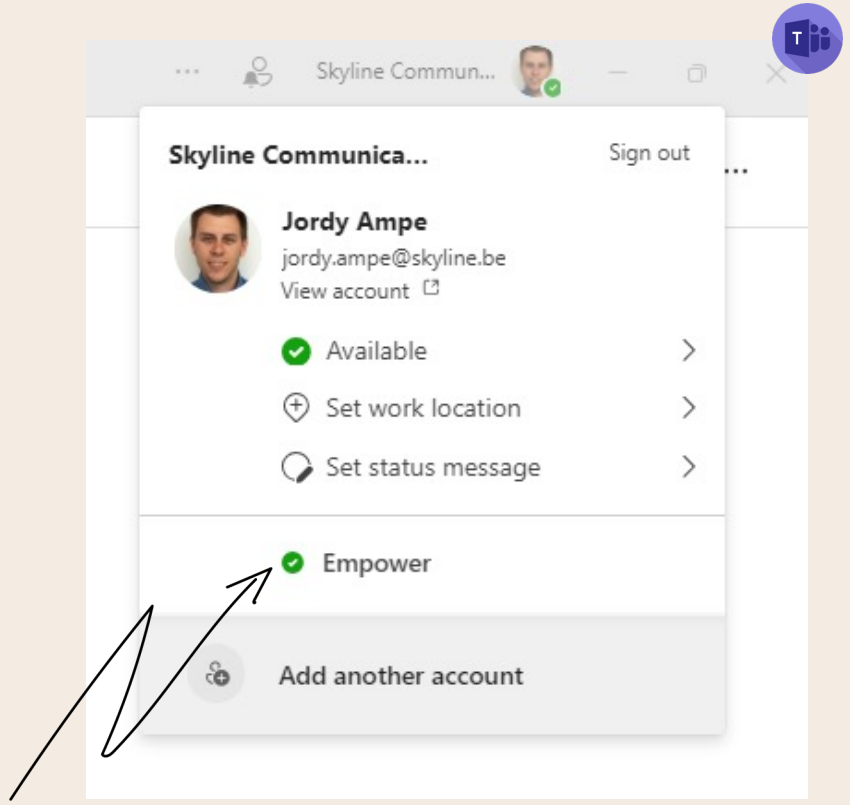
- Scan the QR code or browse to the url
- Complete the form
- Click on the link in the invite that you should have received via email
  - Check your spam folder
- Verify access to Empower tenant



Access Empower Tenant

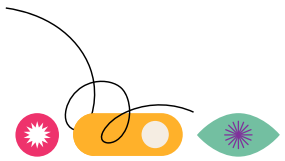
Validate access

- 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?

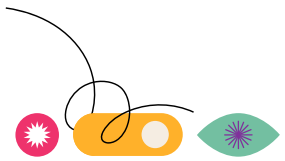


ChatOps

Use case - Bookings

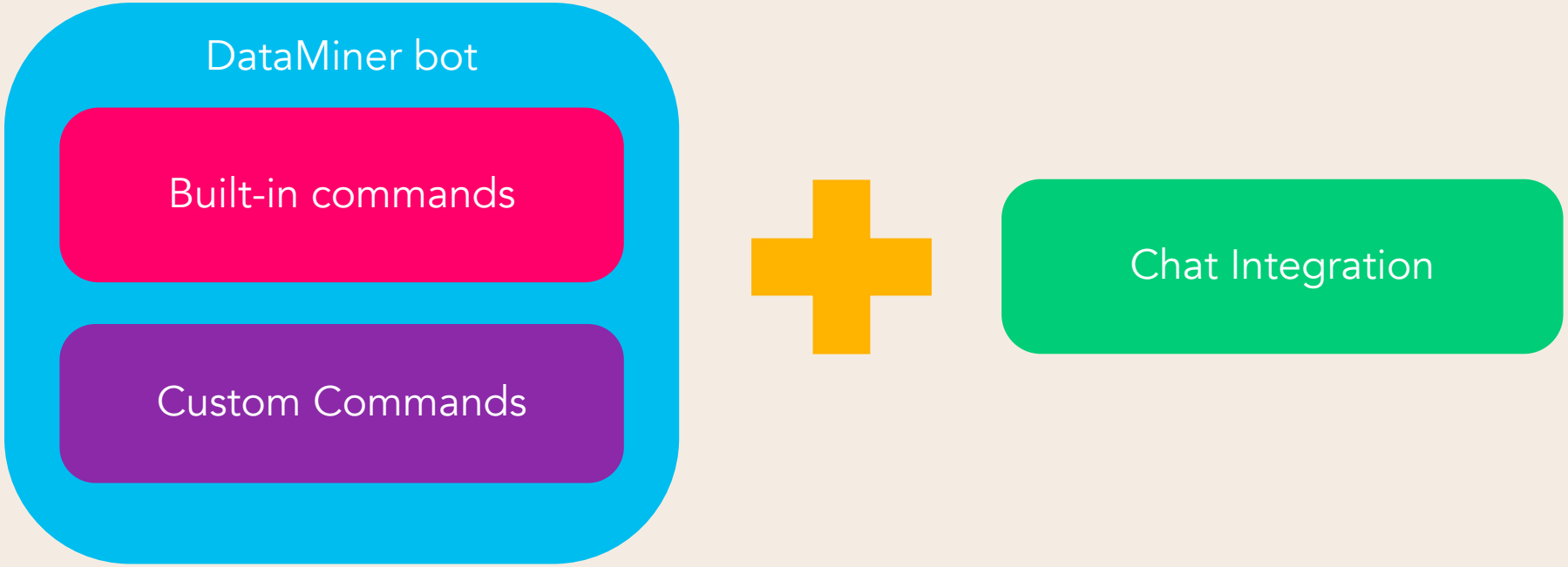
ChatOps

What is it and how does it work?



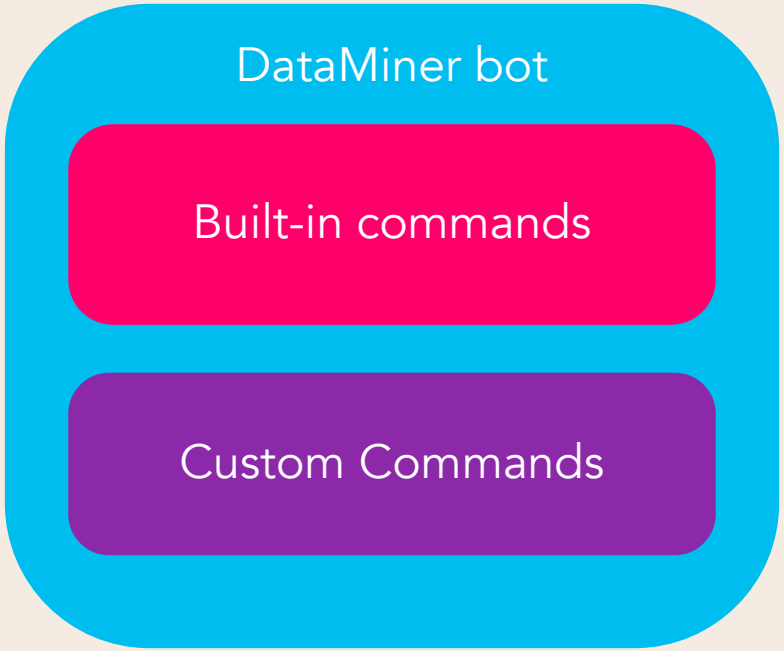
ChatOps

What is it?



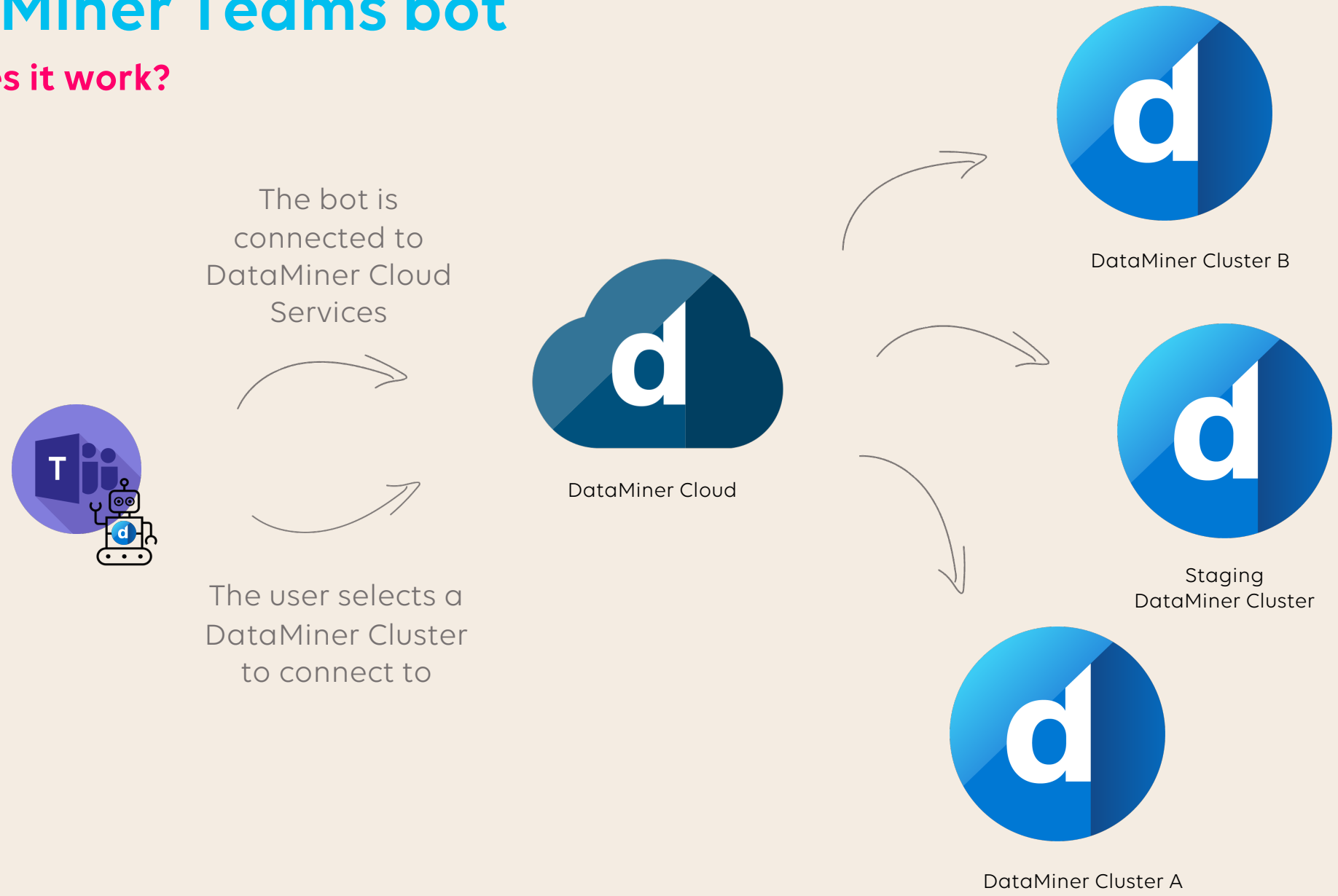
ChatOps

What is it?



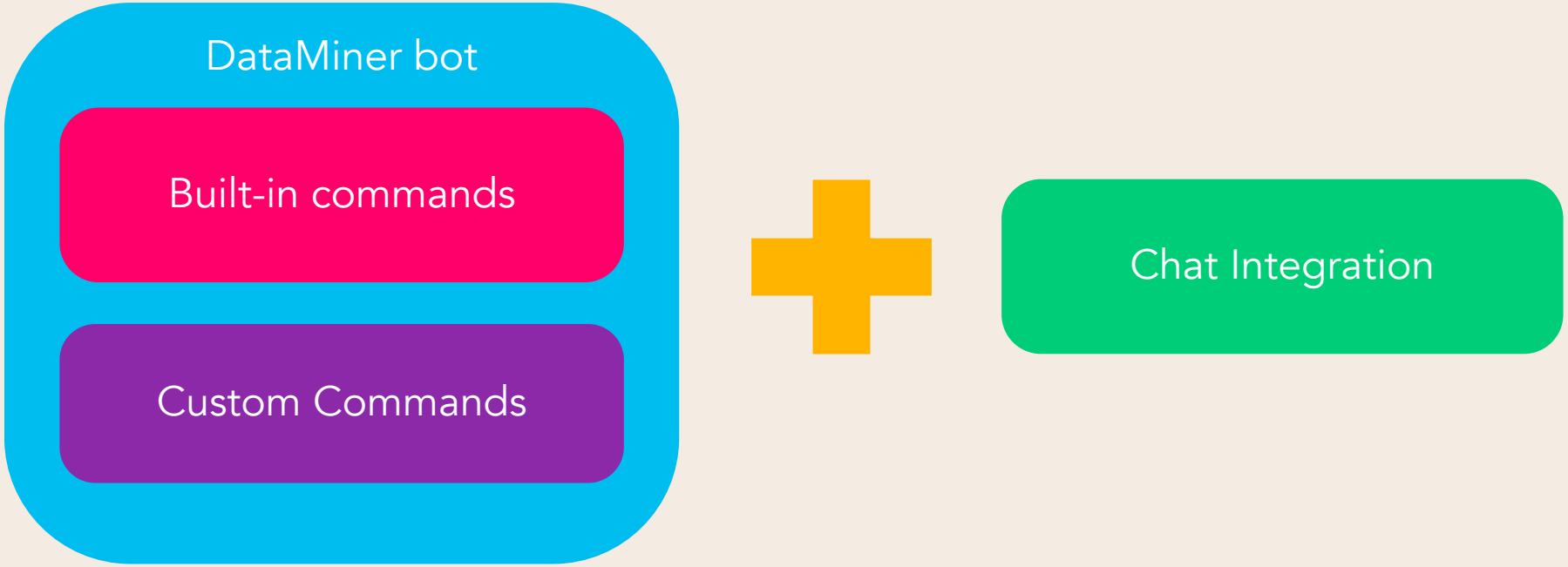
DataMiner Teams bot

How does it work?



ChatOps

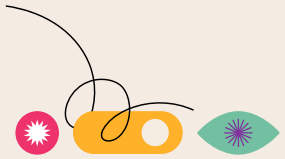
What is it?



ChatOps

What is it?

Chat Integration



Chat Integration

How does it work?

Your Clusters are part of a Cloud Organization

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

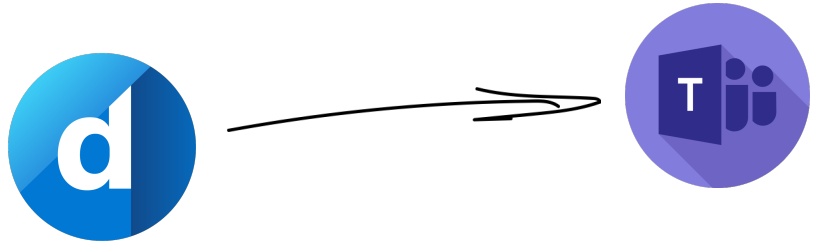
DataMiner Cluster

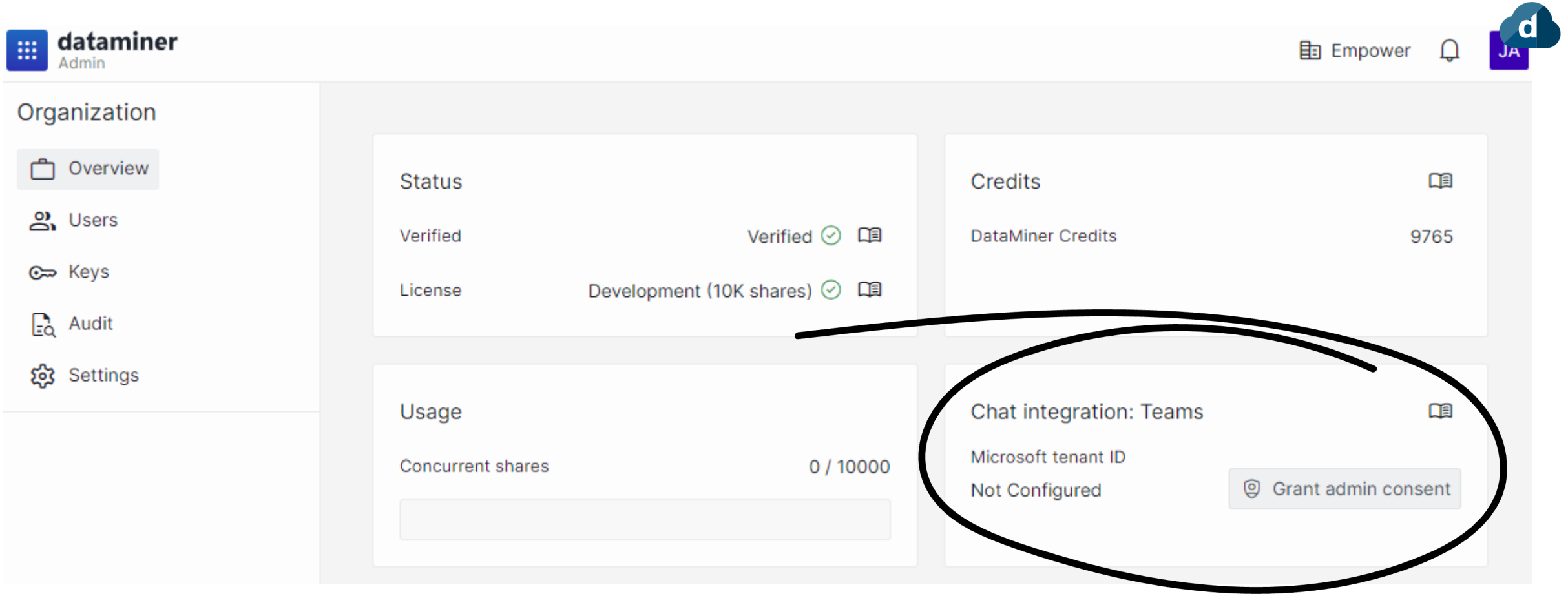
DataMiner Cloud

Your Teams Environment

Granting Admin Consent

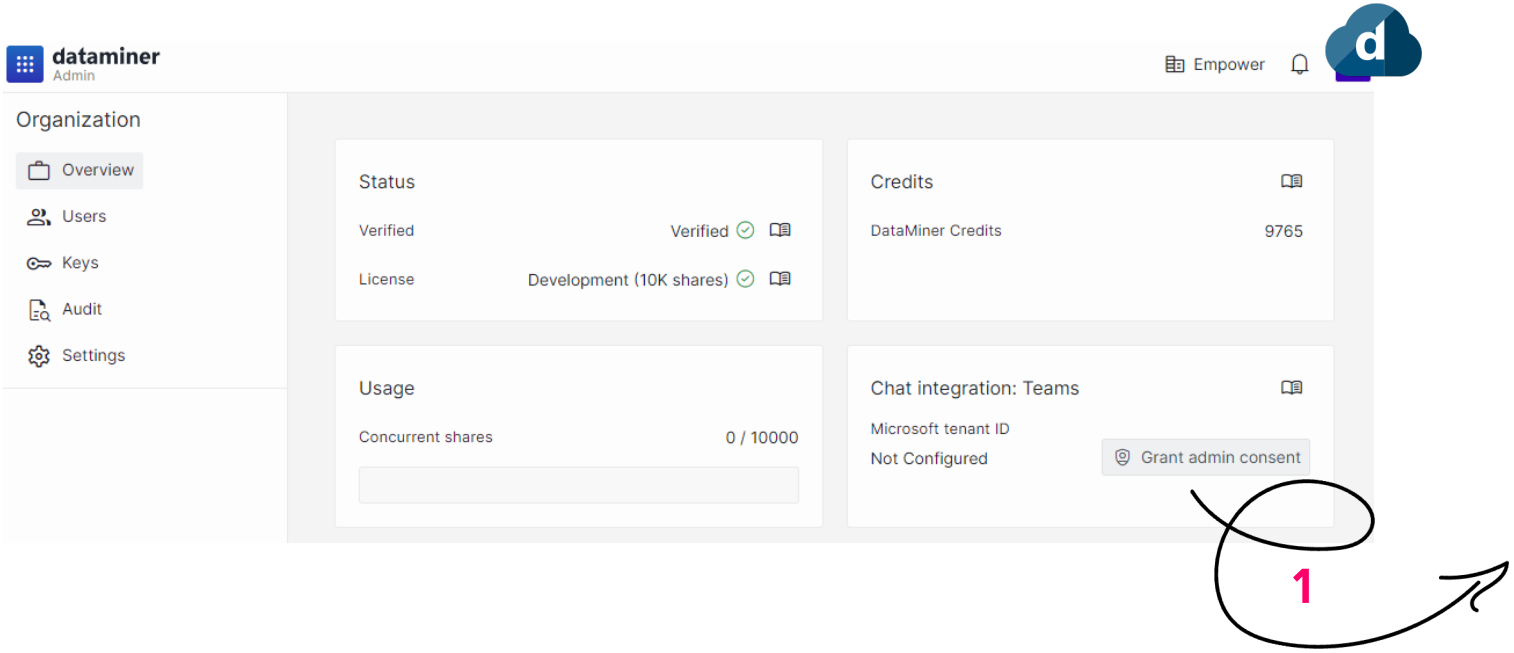
Linking a Microsoft Teams environment to your DMS

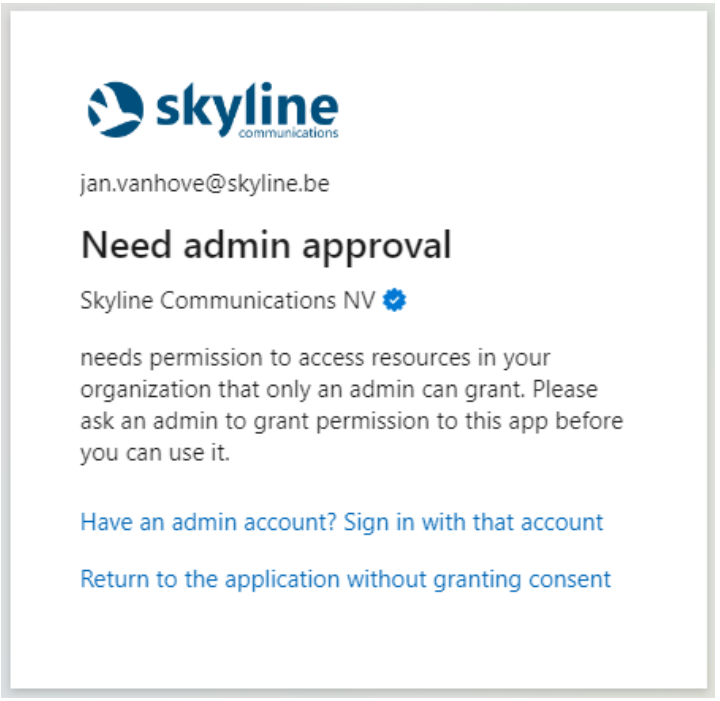




Granting Admin Consent

Linking a Microsoft Teams environment to your DMS

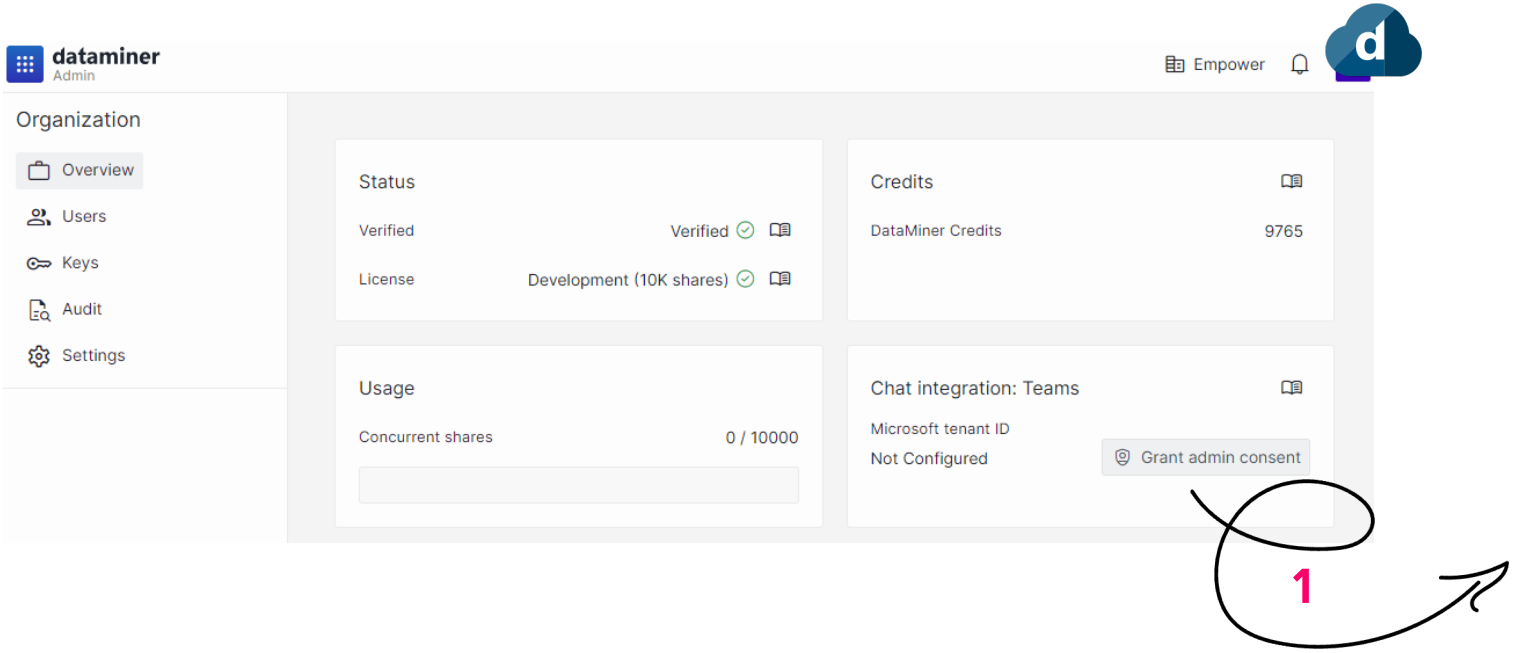


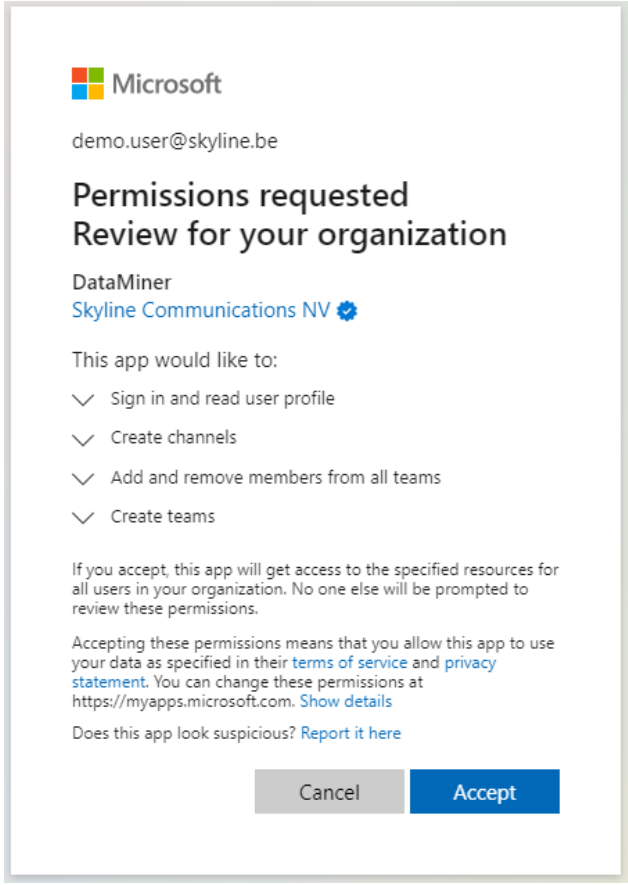


What you would probably see

Granting Admin Consent

Linking a Microsoft Teams environment to your DMS

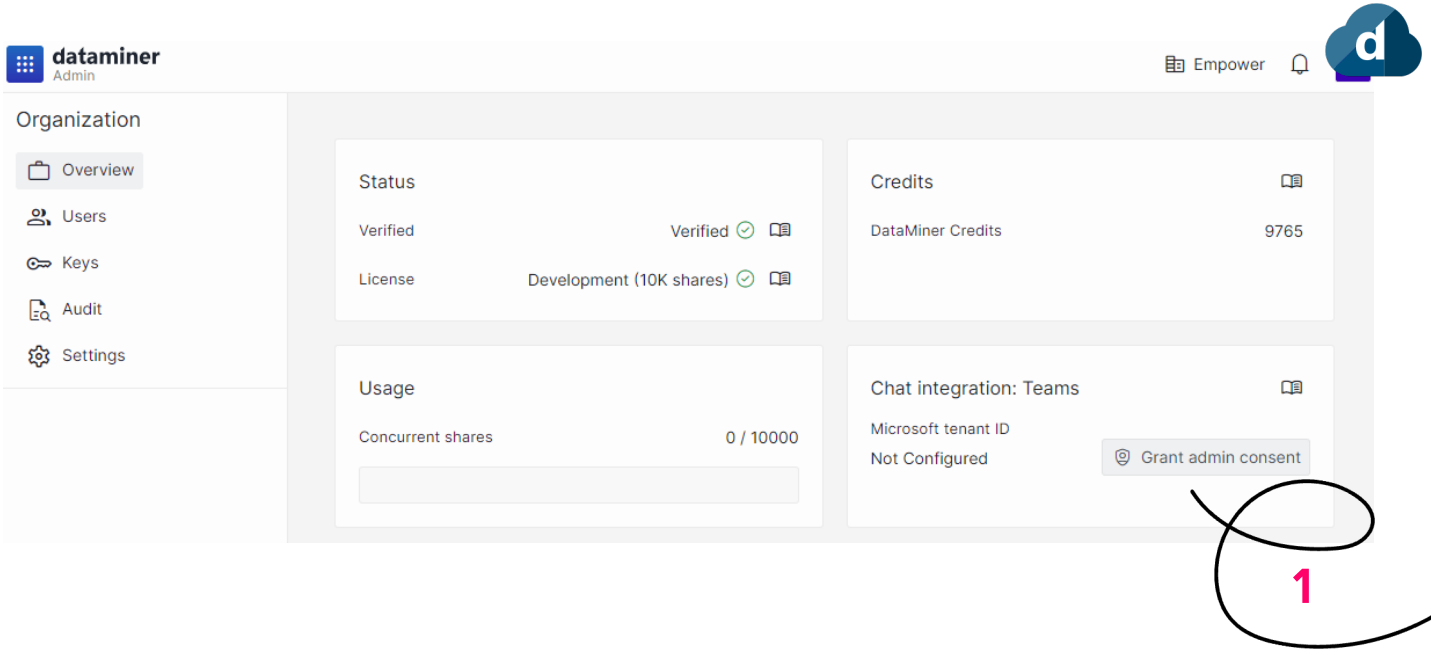


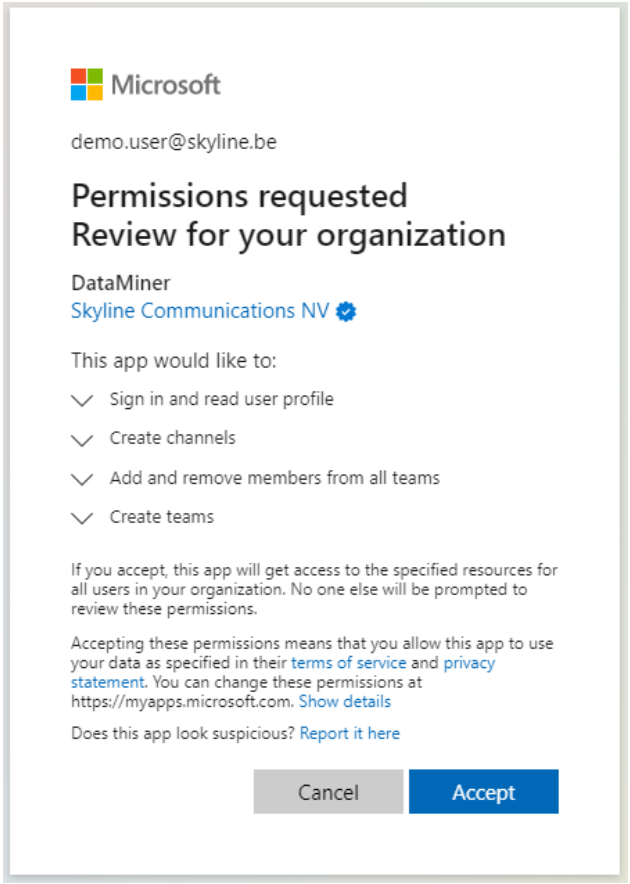


What an IT Admin would see

Granting Admin Consent

Linking a Microsoft Teams environment to your DMS





What an IT Admin would see

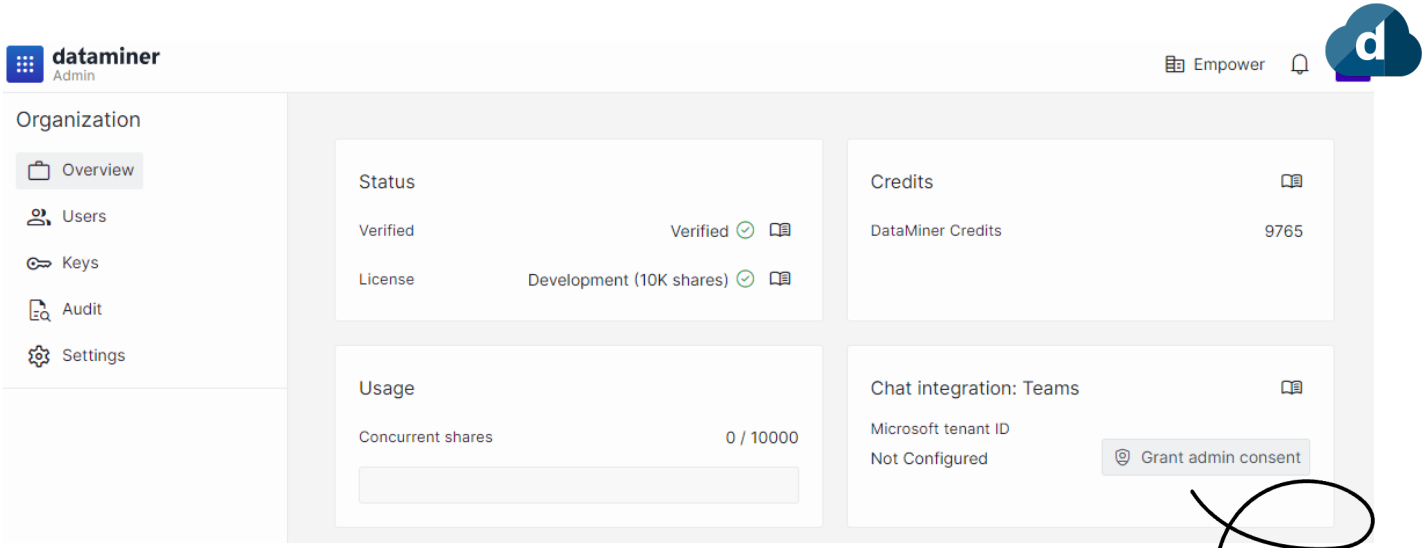
Use these IT Admin credentials for our Empower Teams playground:

admin@4tk1h5.onmicrosoft.com

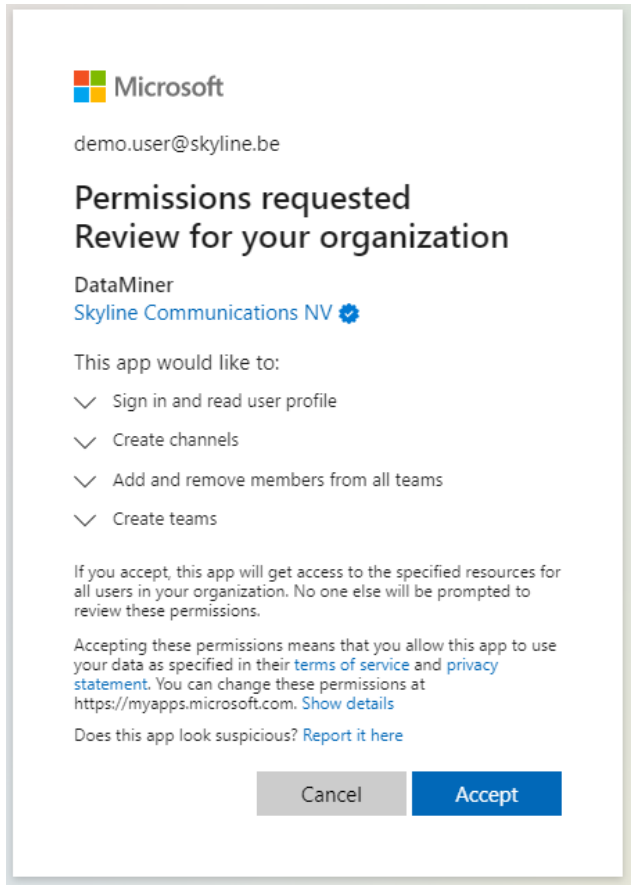
Empower2024!

Granting Admin Consent

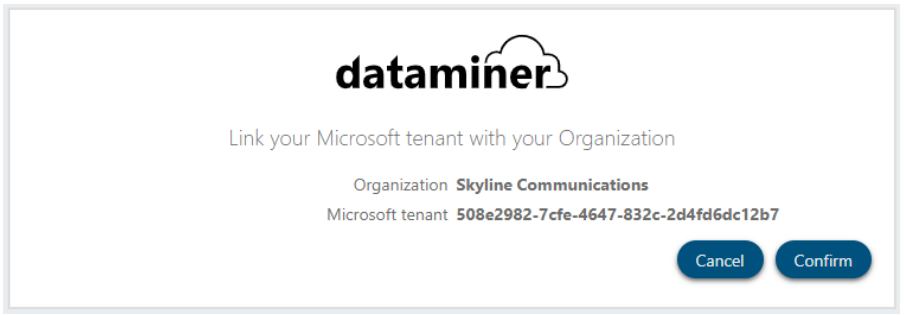
Linking a Microsoft Teams environment to your DMS



1



What an IT Admin would see



2

Confirm the linking

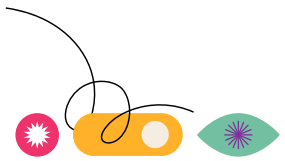
Use these IT Admin credentials for our Empower Teams playground:

admin@4tk1h5.onmicrosoft.com

Empower2024!

Custom Commands vs Chat Integration

What's the difference?



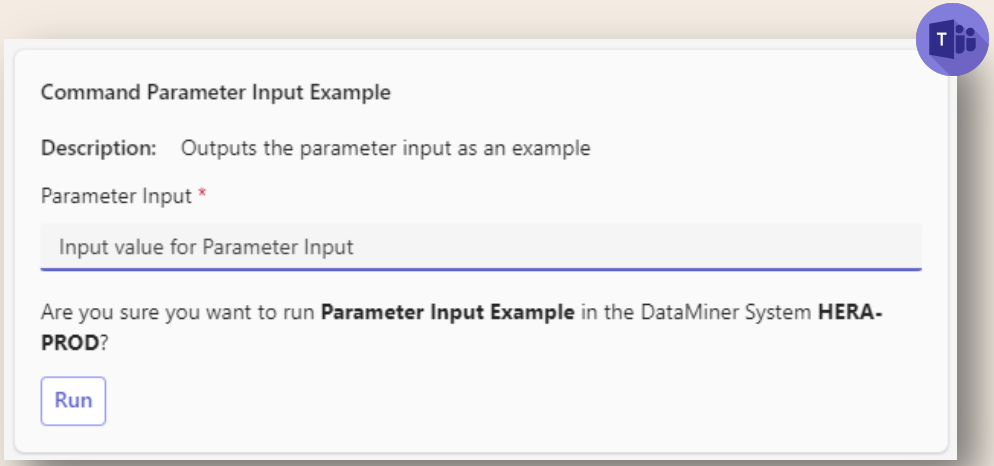
Custom Commands vs Chat Integration

Customize your ChatOps experience

Custom Commands

- Automation scripts in /bot/ folder
- Display custom output

- Triggered by a user
- Inputs available via interface



Chat Integration

- Automation scripts
- Display custom output

- Triggered automatically by DataMiner

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

Tip

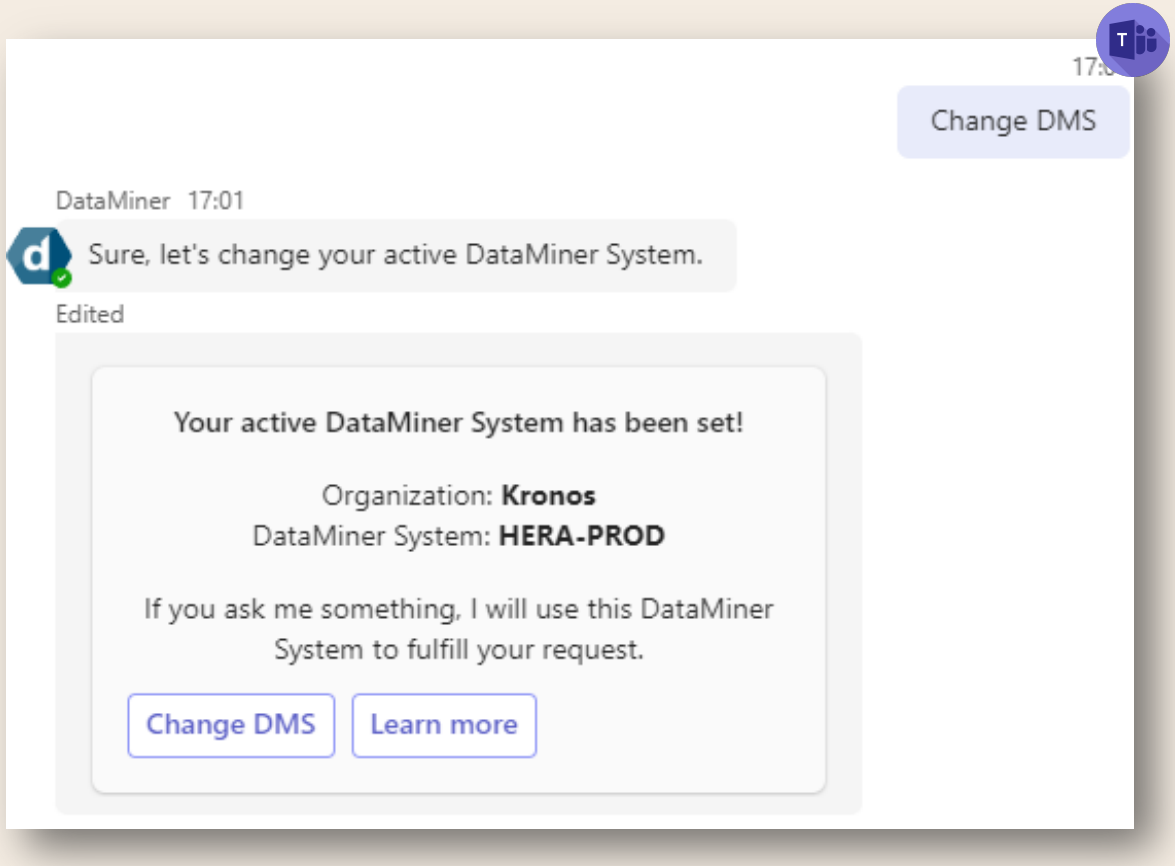
Channels vs Chats

What's the difference when using the DataMiner bot?

Channels vs Chats

Chats

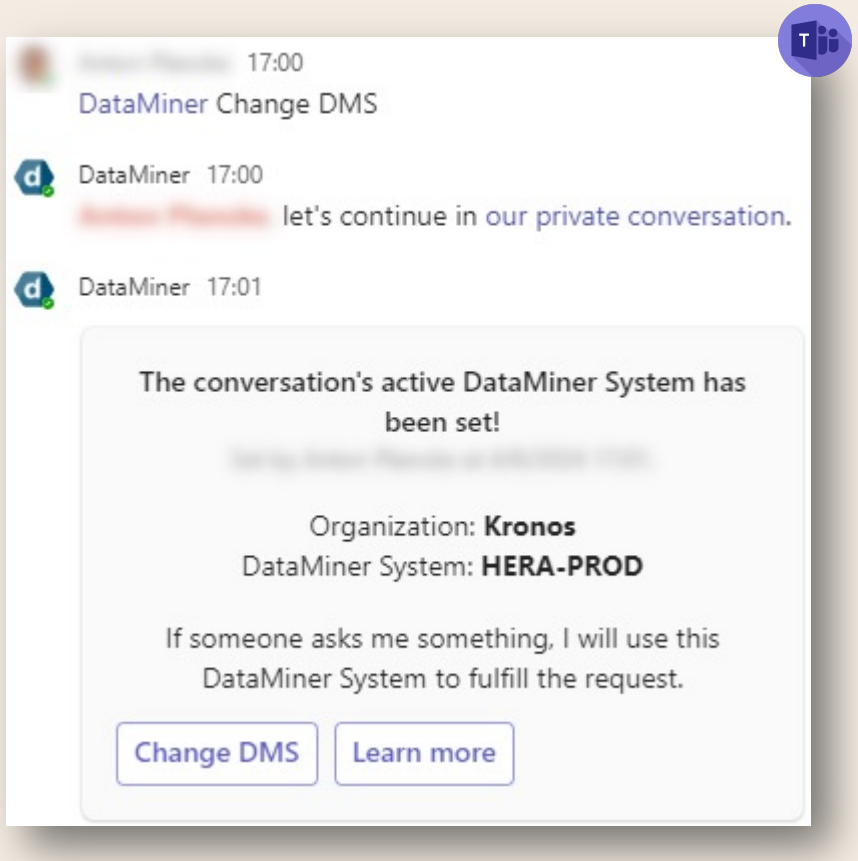
- Private conversation with the DataMiner bot
- 1 active DMS per chat



Channels vs Chats

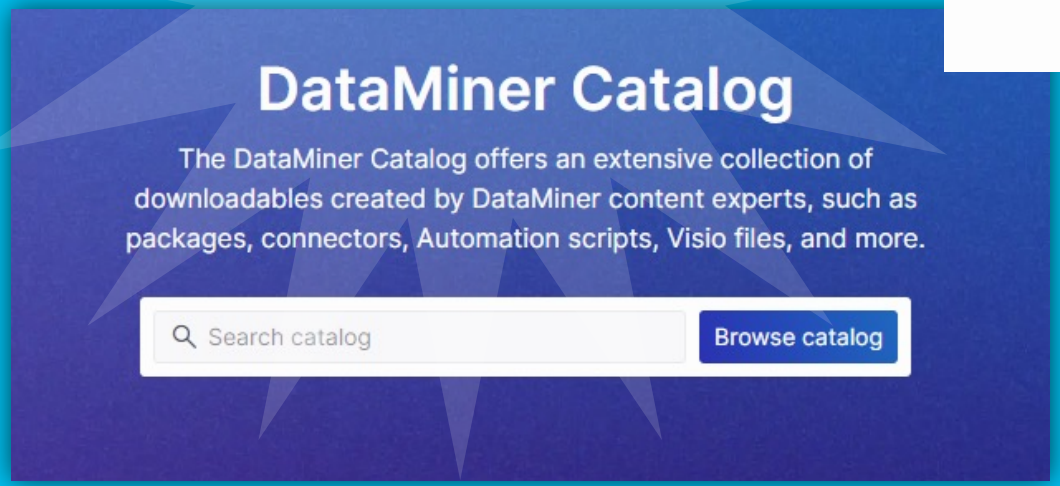
Channels

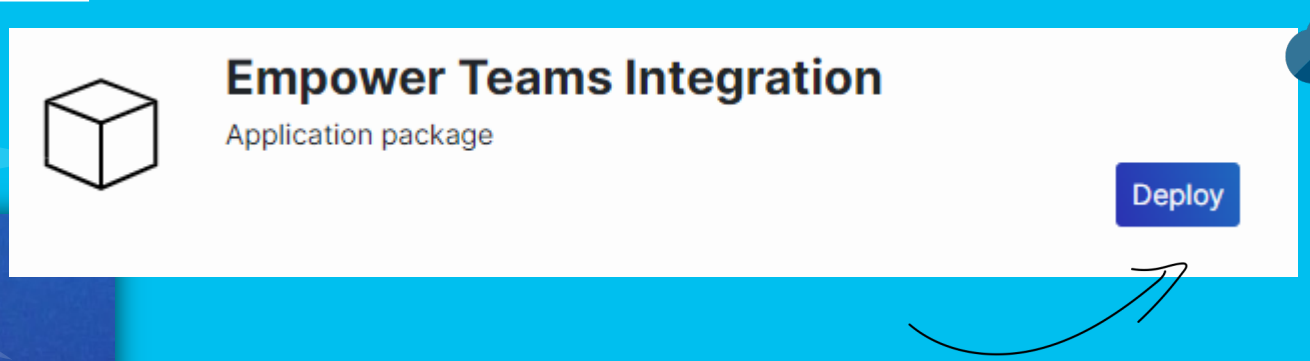
- Collaborate with the DataMiner bot together
- 1 active DMS per channel post
- Not everyone will have access
- Some commands will redirect to private chat



Hands-on time!

- Go to '**catalog.dataminer.services**'
- Search for '**Empower Teams integration**'
- Deploy package to your DMS





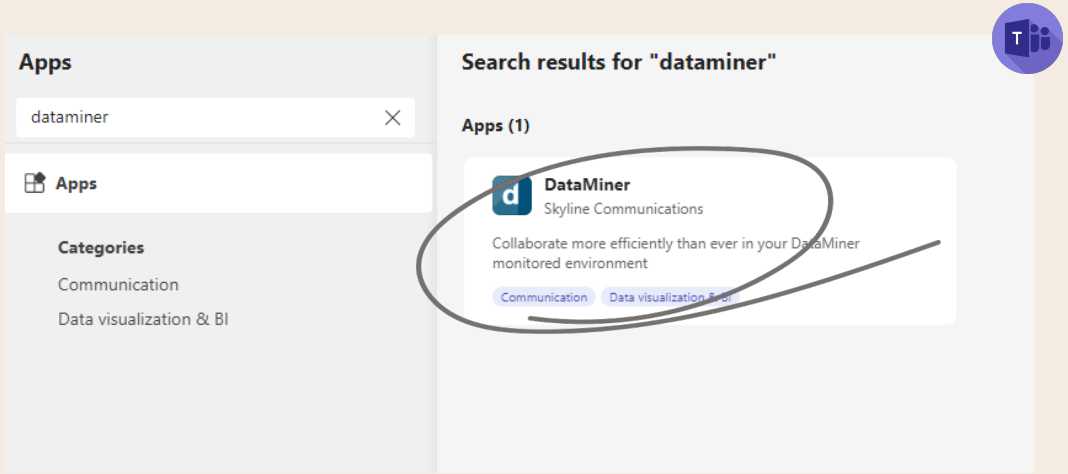
DataMiner Teams Bot

Bots and DataMiner, the dynamic duo

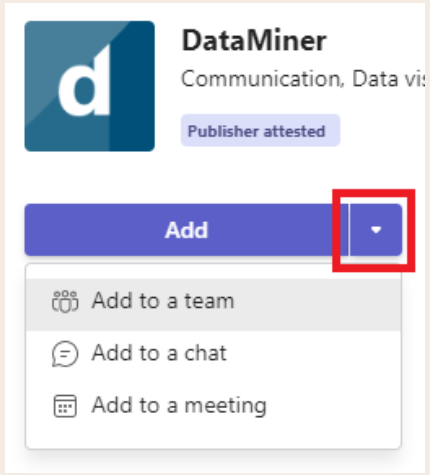
DataMiner Teams Bot

Installation

1
In MS Teams search the DataMiner App



2
Add to your Teams

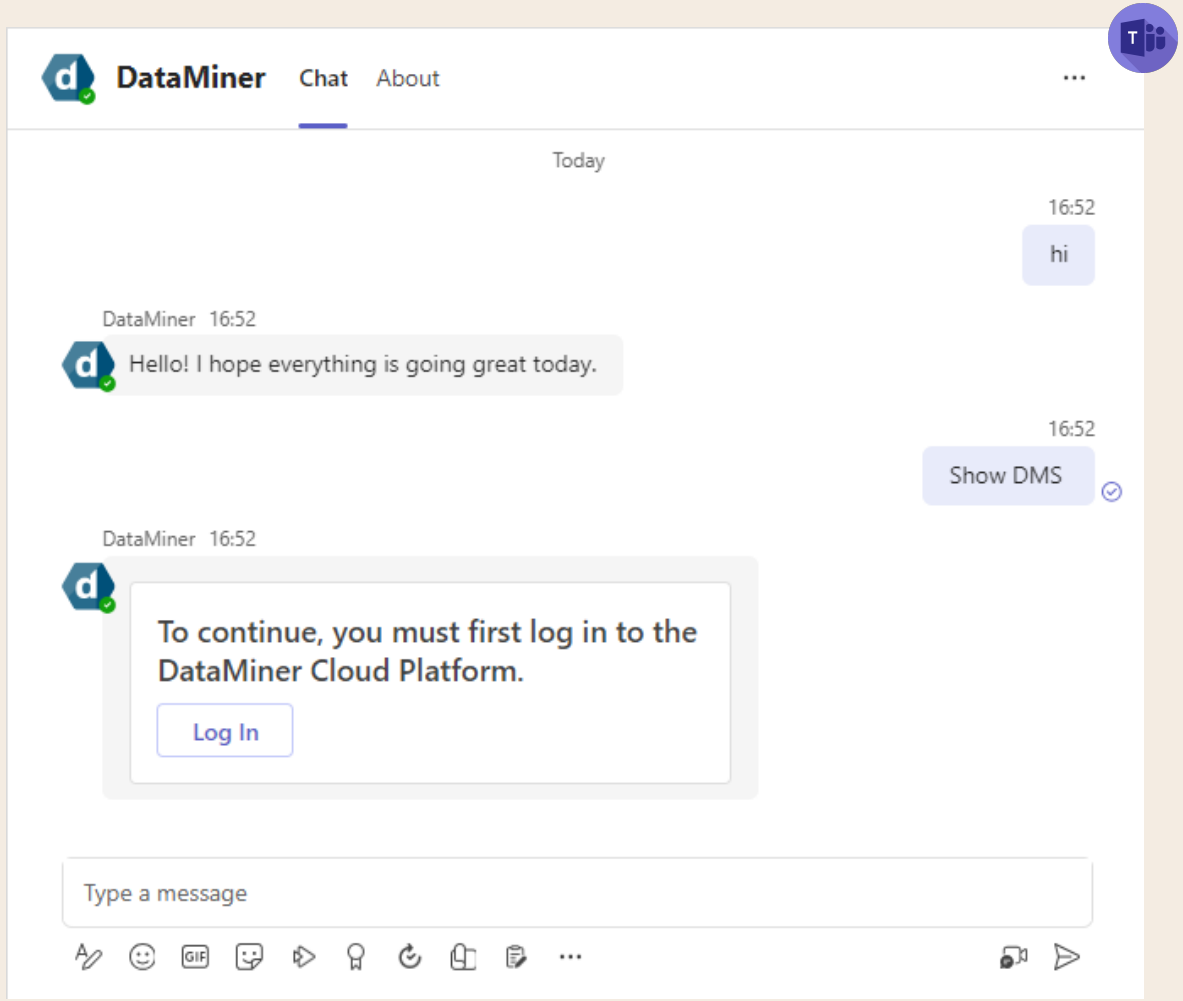


3
Ready to chat

DataMiner Teams Bot

Start a conversation – say hi

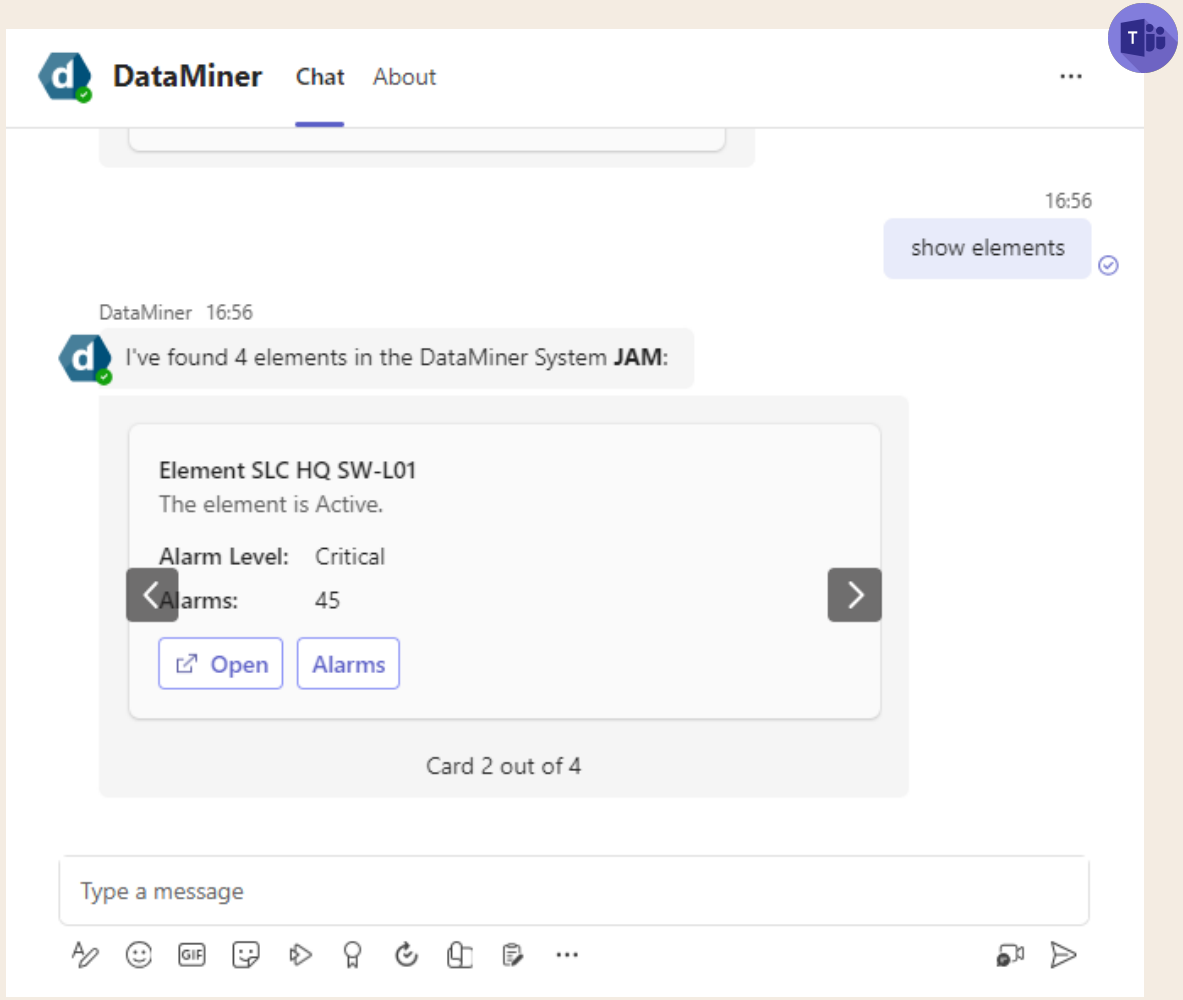
- Say “**hi**”
- Say “**Show DMS**”
- Click login



DataMiner Teams Bot

Start a conversation – find your element

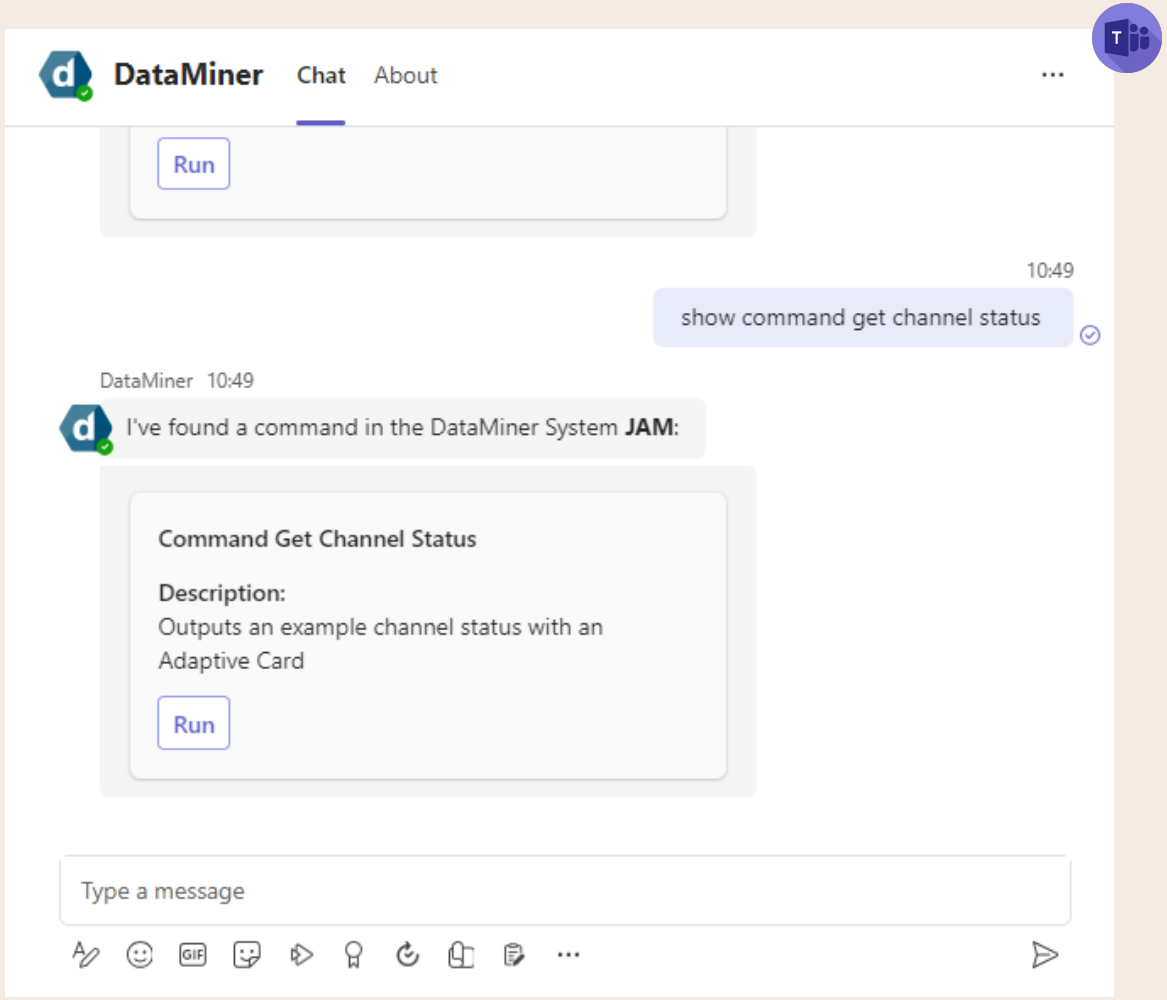
- Say “**show elements**”
- Slide to element “SLC HQ SW-L01”
- Press “**Alarms**” button



DataMiner Teams Bot

Custom commands

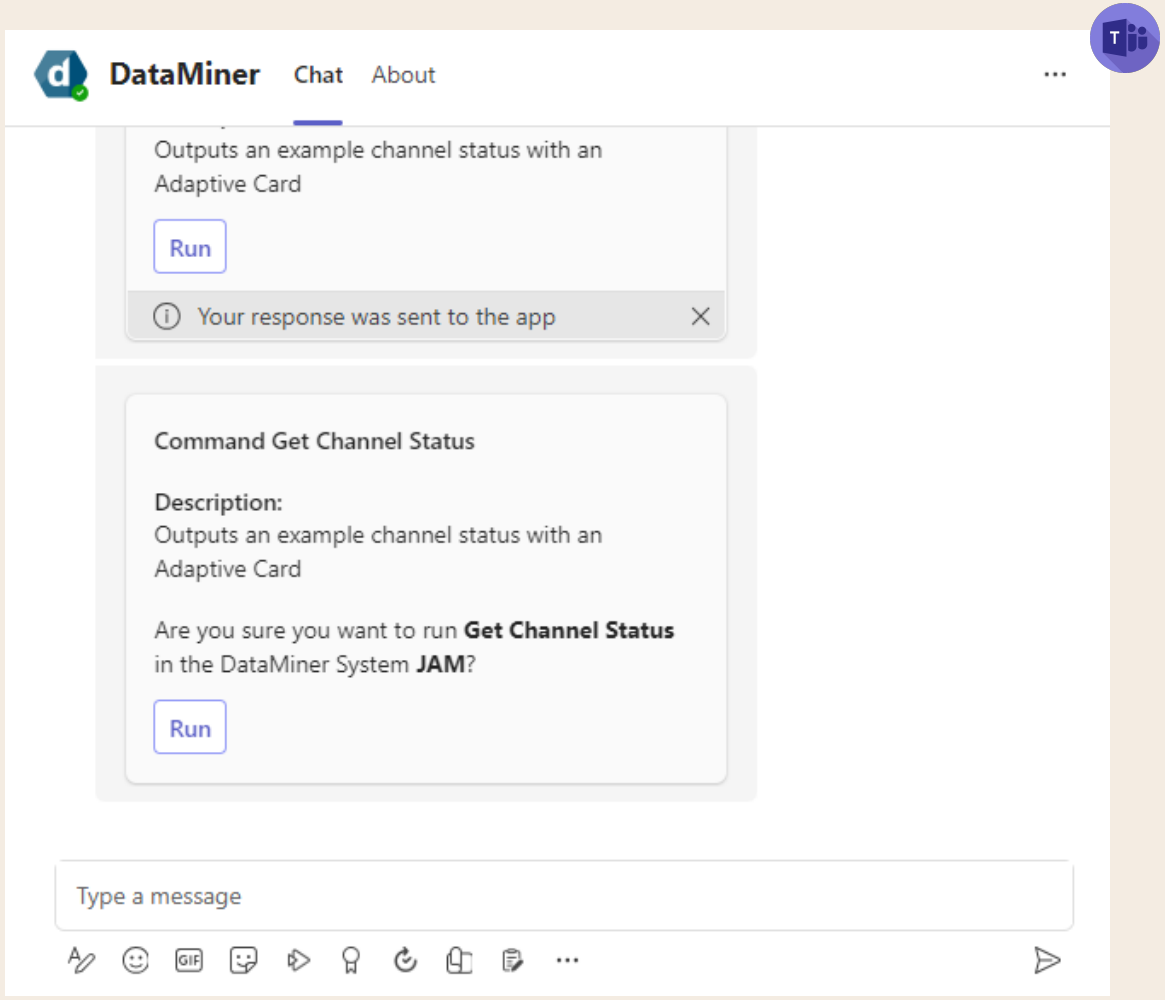
- Say “**show commands**”
- Say “**show command Get Channel Status**”
- Press “**run**”



DataMiner Teams Bot

Custom commands

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

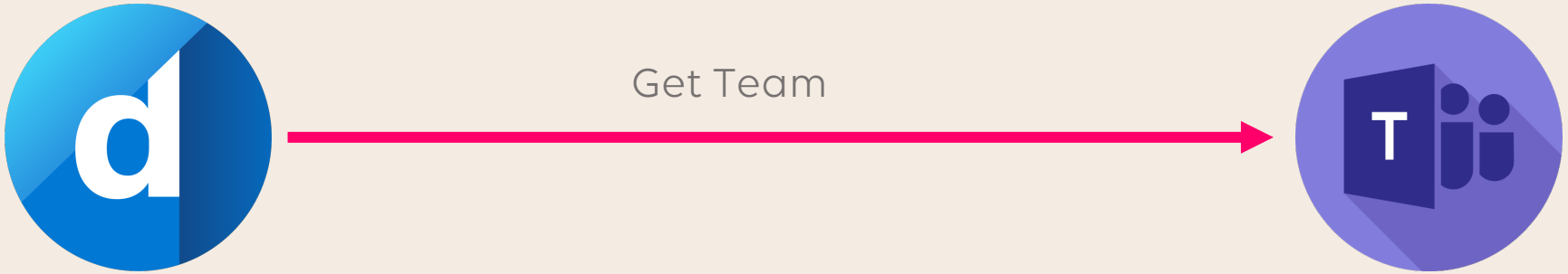


ChatOps Integration

Bridging the gap, DataMiner meets Teams

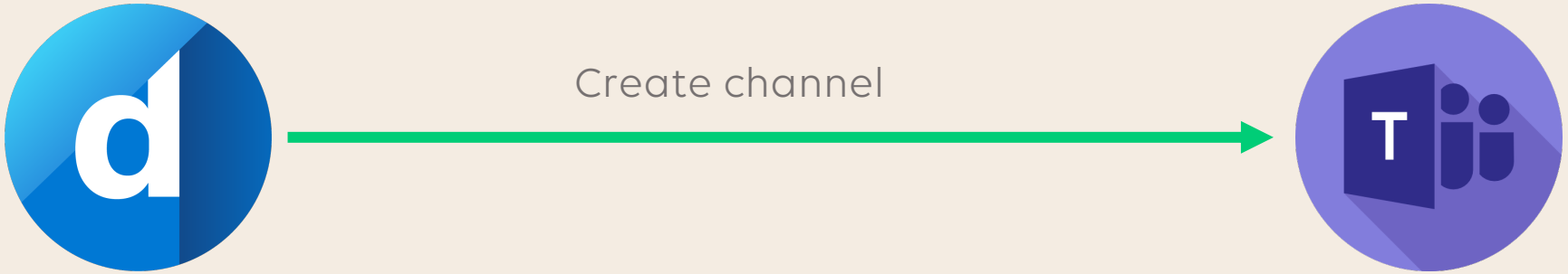
ChatOps Integration

Interact with Teams from DataMiner



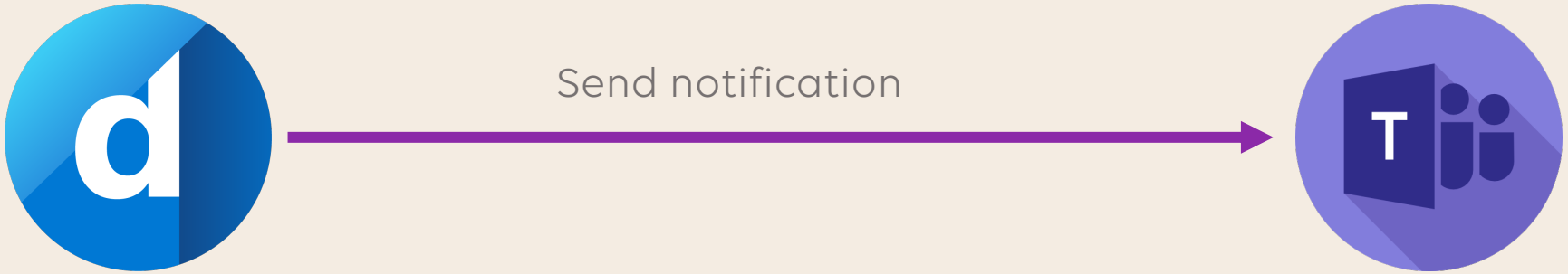
ChatOps Integration

Interact with Teams from DataMiner



ChatOps Integration

Interact with Teams from DataMiner

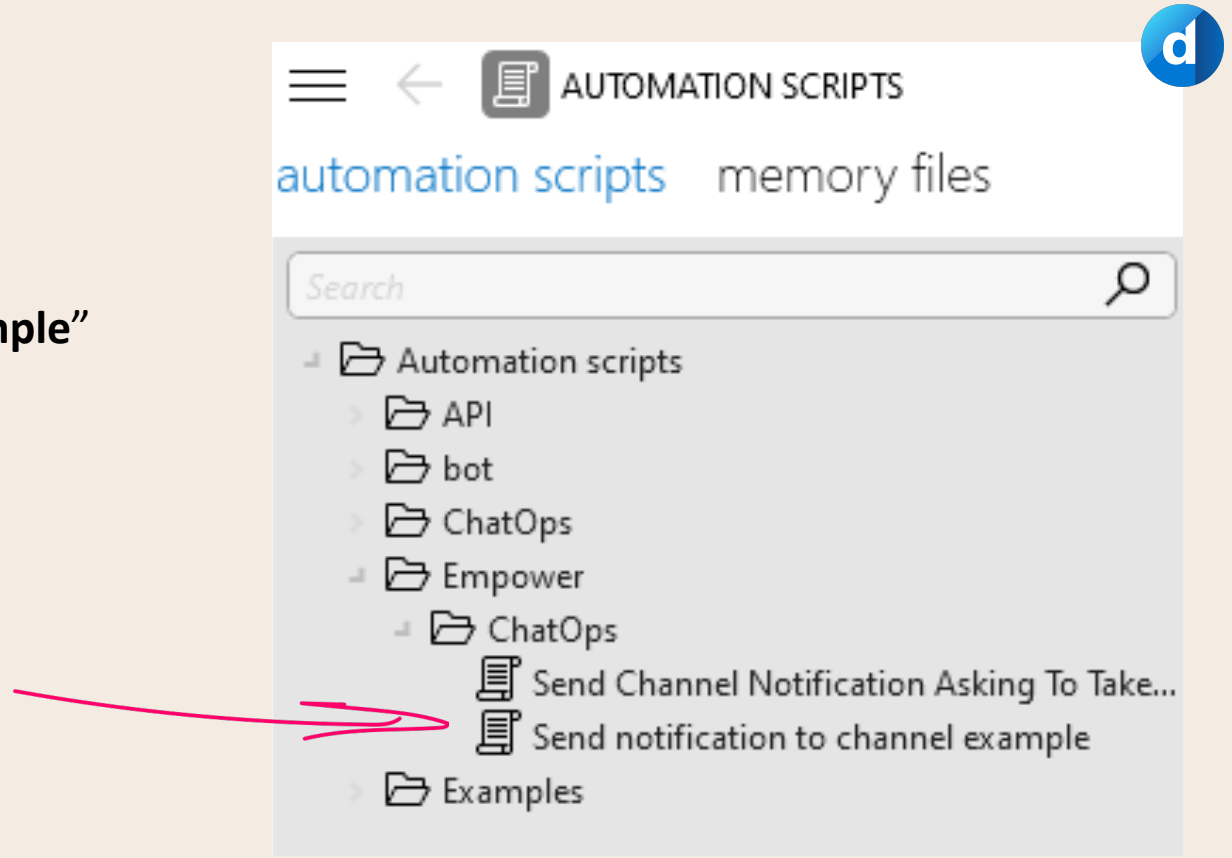


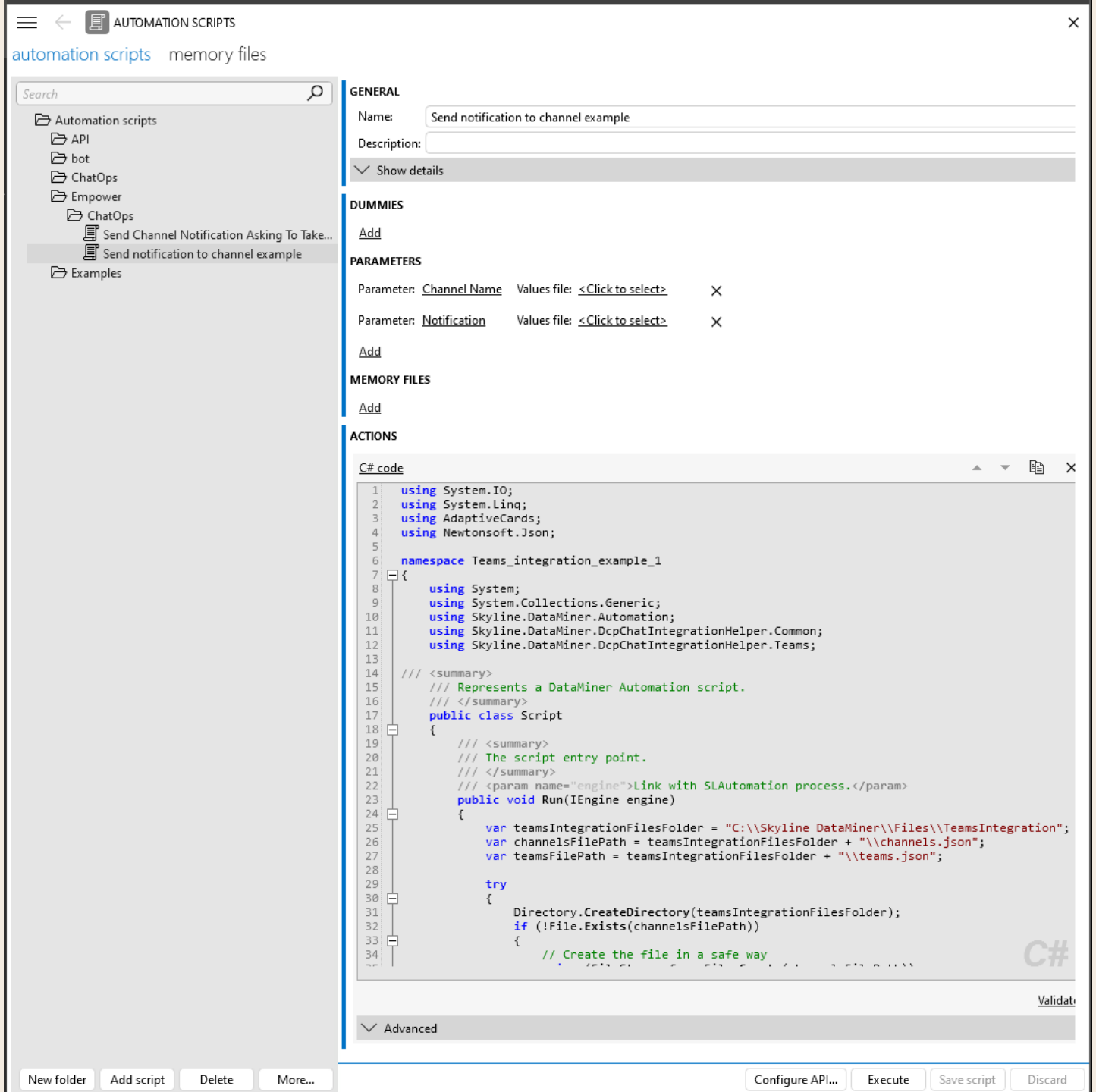
Chat Integration

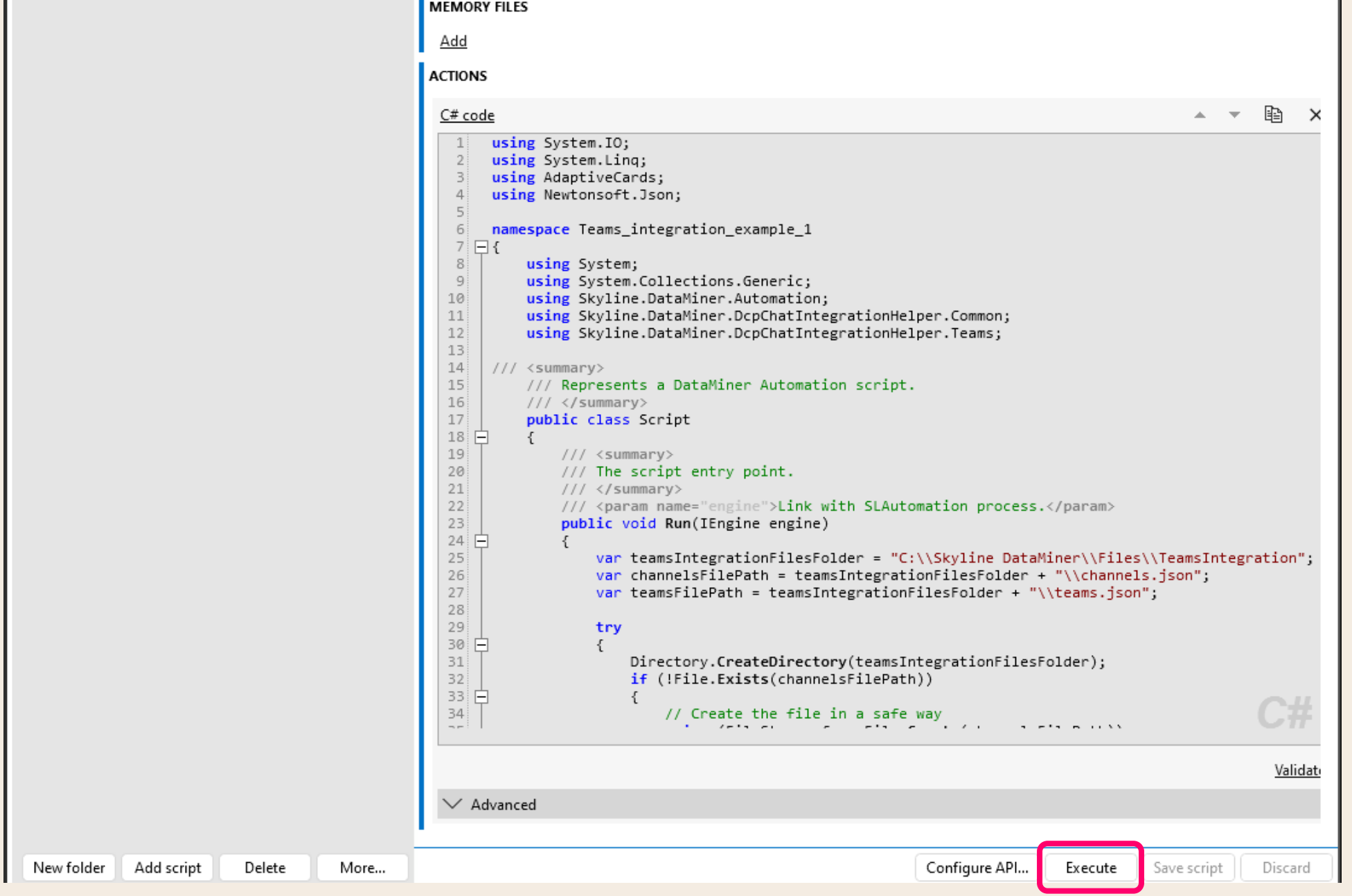
Interact with Teams from DataMiner

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

  Under Empower/ChatOps
- Select the script




AUTOMATION SCRIPTS
automation scripts
memory files
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>
Parameter: Notification
Values file: <Click to select>
Add
MEMORY FILES
Add
ACTIONS
C# code
using System.IO;
using System.Linq;
using AdaptiveCards;
using Newtonsoft.Json;
namespace Teams_integration_example_1
{
using System;
using System.Collections.Generic;
using Skyline.DataMiner.Automation;
using Skyline.DataMiner.DcpChatIntegrationHelper.Common;
using Skyline.DataMiner.DcpChatIntegrationHelper.Teams;
/// <summary>
/// Represents a DataMiner Automation script.
/// </summary>
public class Script
{
/// <summary>
/// The script entry point.
/// </summary>
/// <param name="engine">Link with SLAutomation process.</param>
public void Run(IEngine engine)
{
var teamsIntegrationFilesFolder = "C:\\Skyline DataMiner\\Files\\TeamsIntegration";
var channelsFilePath = teamsIntegrationFilesFolder + "\\channels.json";
var teamsFilePath = teamsIntegrationFilesFolder + "\\teams.json";
try
{
Directory.CreateDirectory(teamsIntegrationFilesFolder);
if (!File.Exists(channelsFilePath))
{
// Create the file in a safe way
C#
Validat
Advanced
New folder
Add script
Delete
More...
Configure API...
Execute
Save script
Discard


MEMORY FILES
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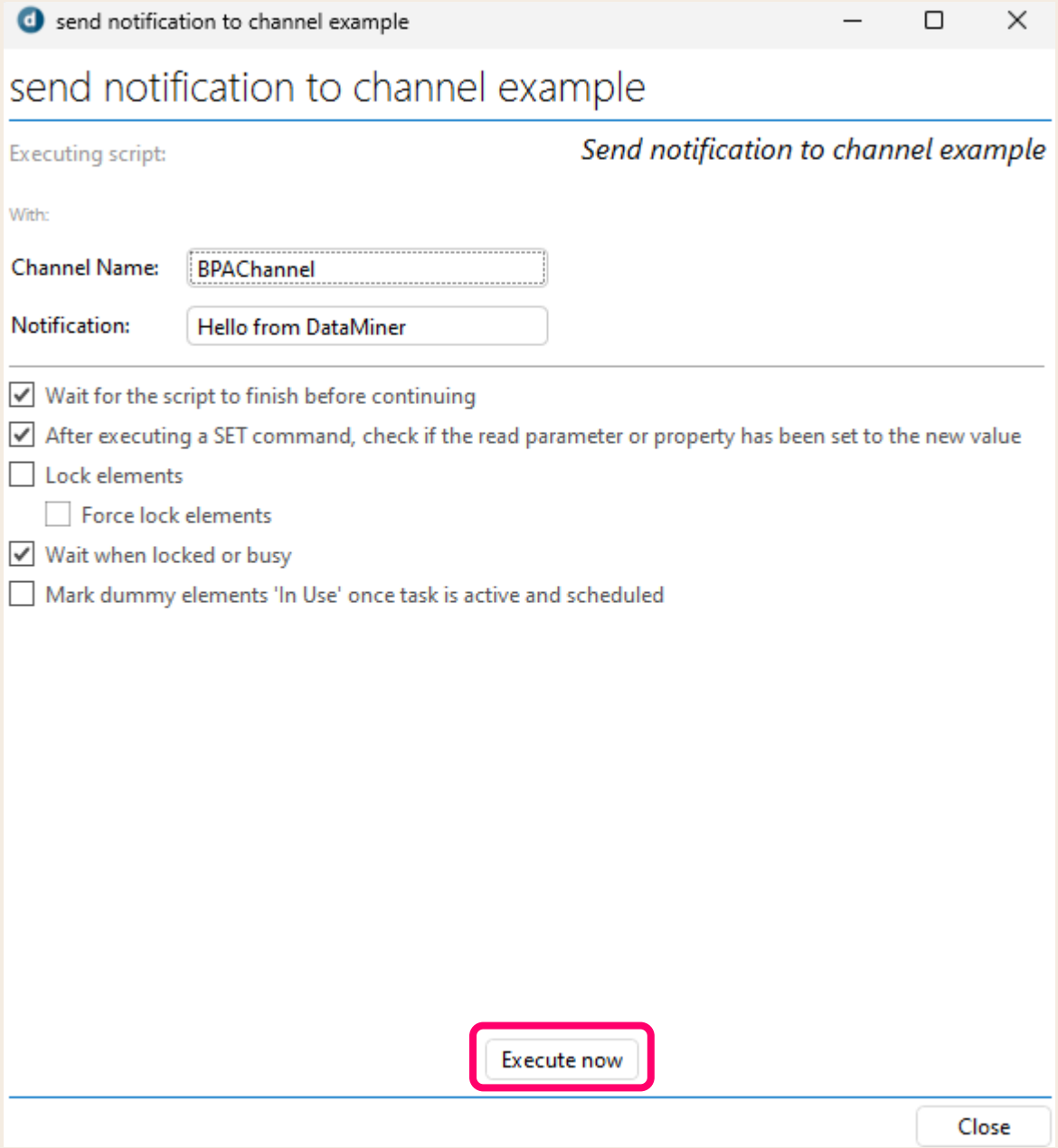
// Create the file in a safe way
C#
Validat
Advanced
New folder
Add script
Delete
More...
Configure API...
Execute
Save script
Discard

Chat Integration

Interact with Teams from DataMiner

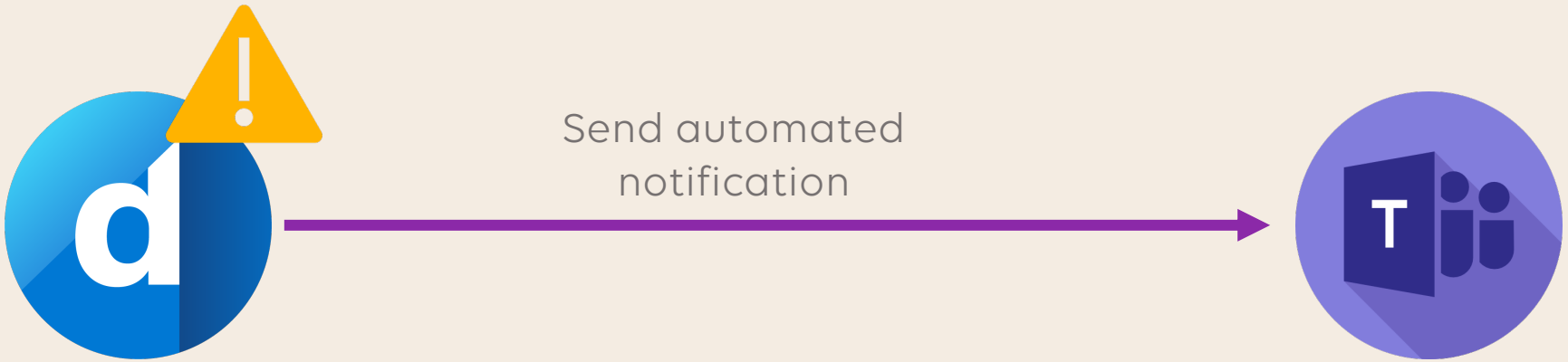
- Fill in channel name

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



ChatOps Integration

Automatic notifications



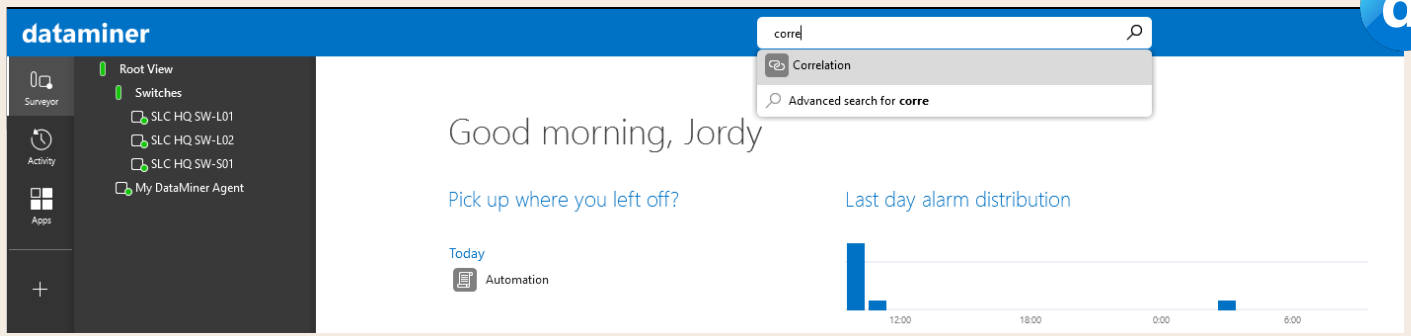
ChatOps Integration

Automatic notifications

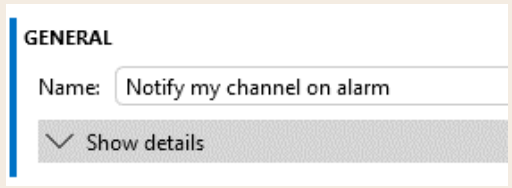
ChatOps Integration

Automatic notifications: setup correlation rule

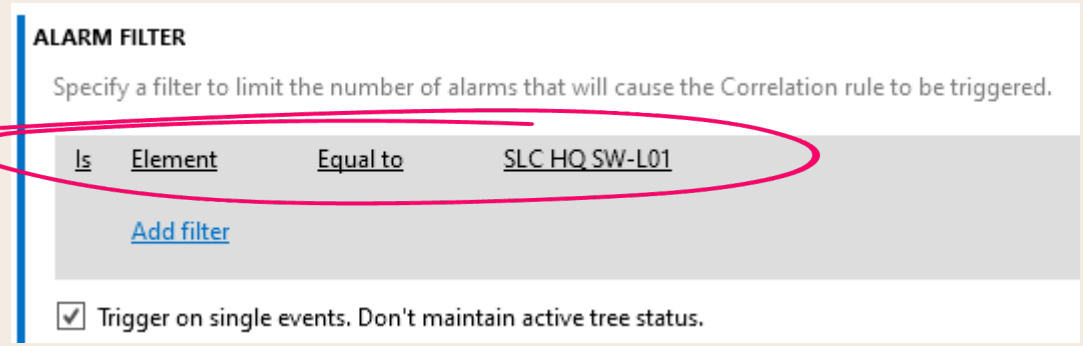
- Open Cube
- Open the **Correlation** module
- Press “**Add rule**” at the bottom



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



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

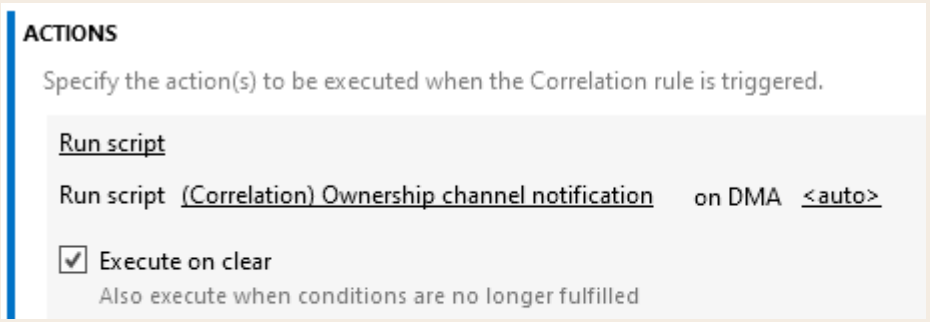


ChatOps Integration

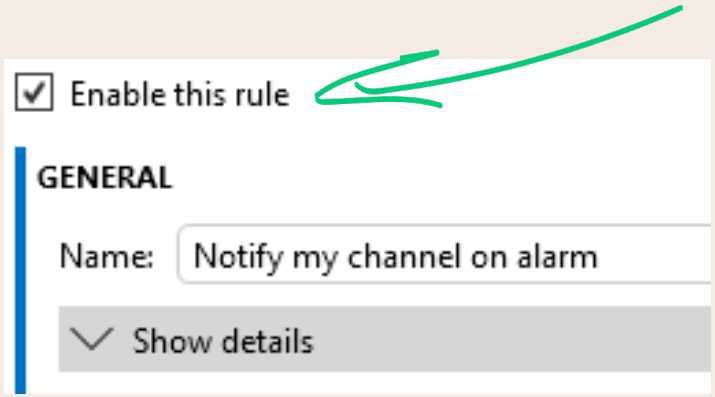
Automatic notifications: setup correlation rule

Apply a “**run script**” action

- Select “**(Correlation) Ownership channel notification**”



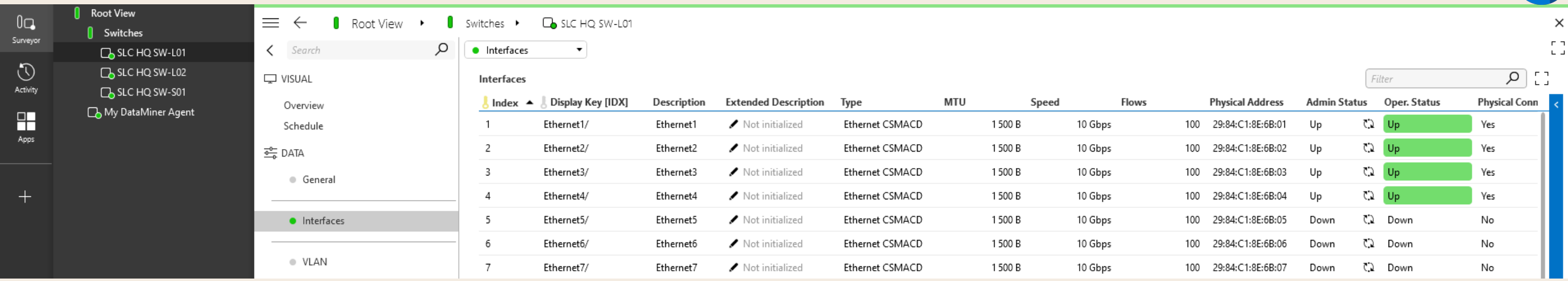
- Check **“Execute on clear”**



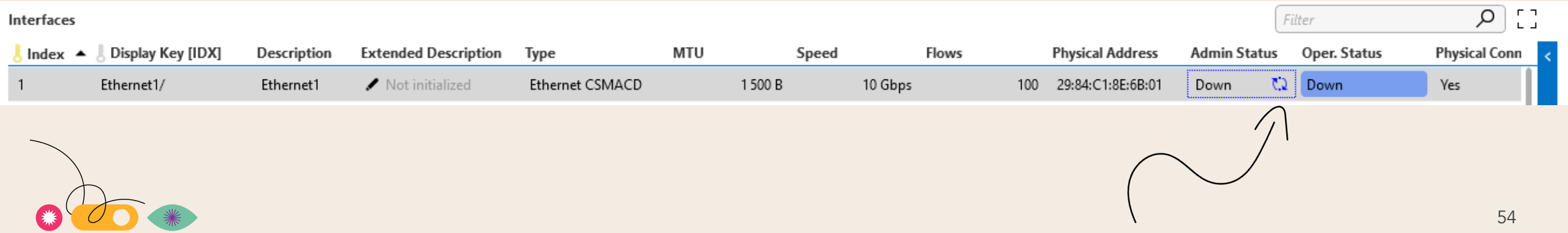
- Click “**Enable rule**”
- Click “**Apply**”

ChatOps Integration

Automatic notifications: simulate alarm



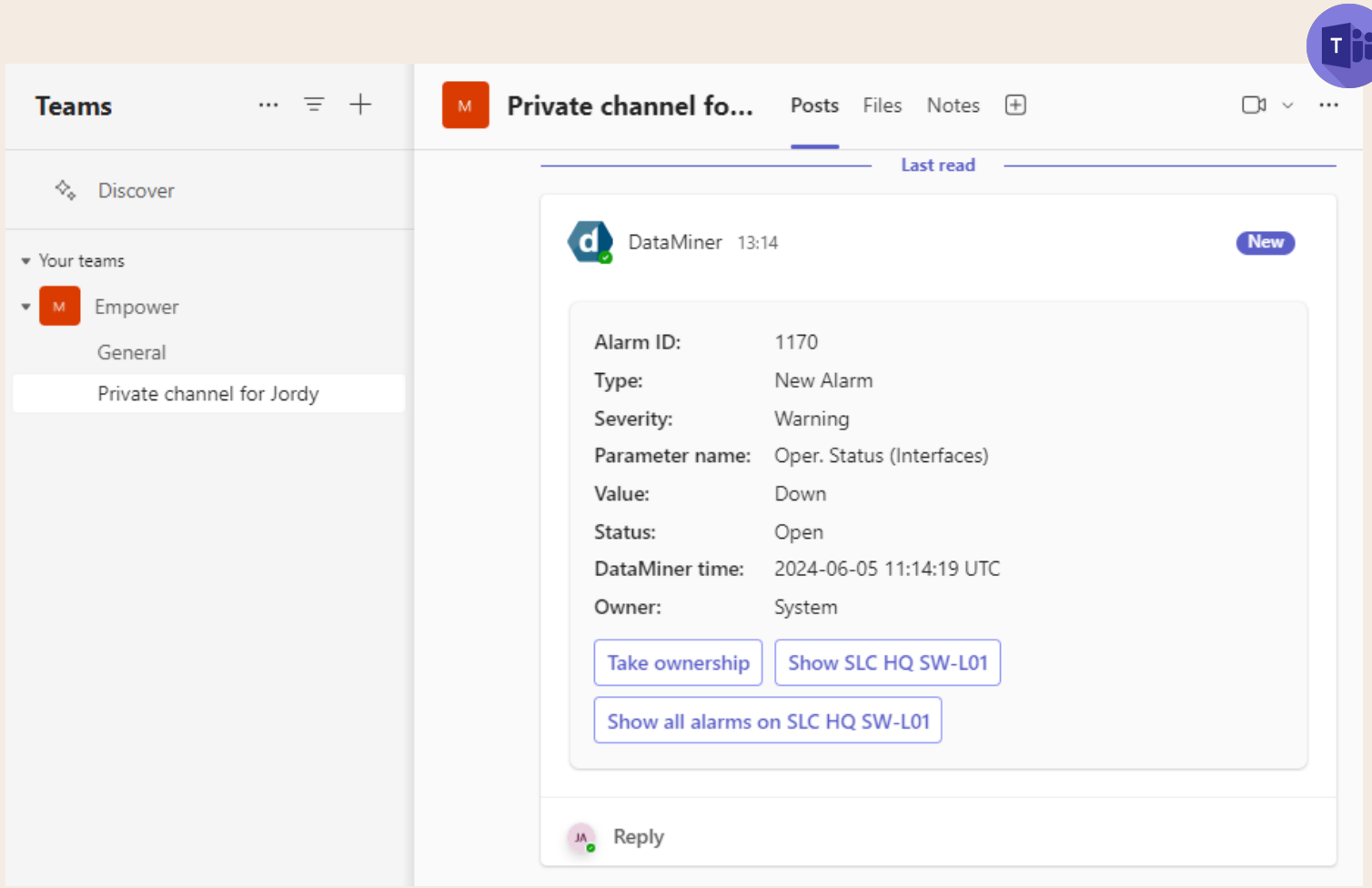
Go to “SLC HQ SW-L01” and bring down “Ethernet1”



ChatOps Integration

Automatic notifications: take ownership of alarm

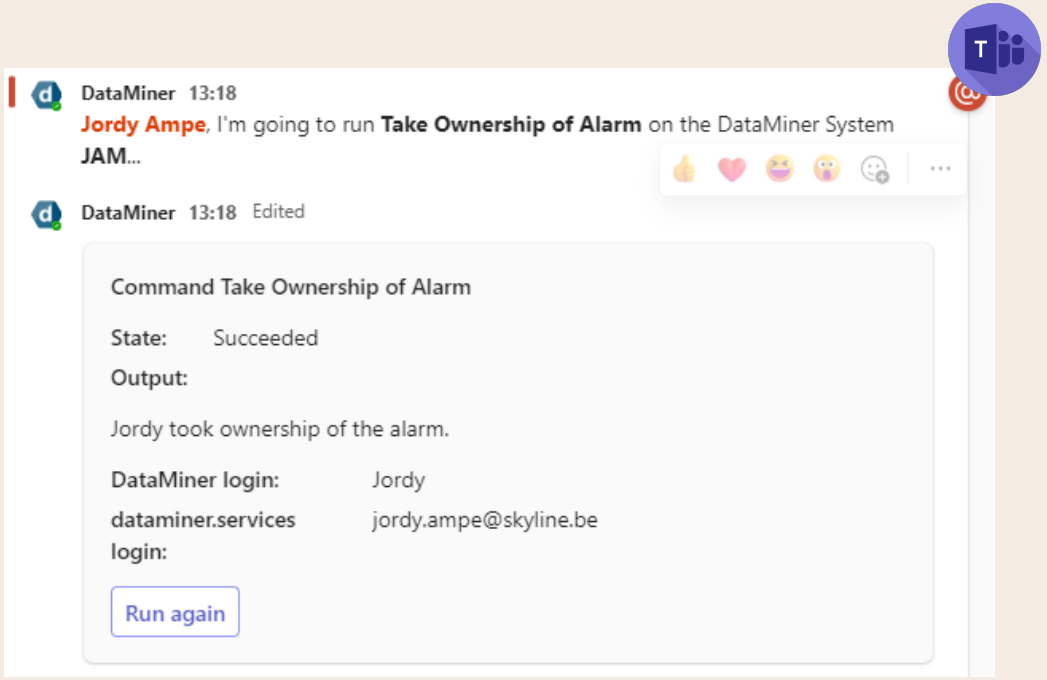
- Verify the notification in your Channel
- Press “**Take ownership**”

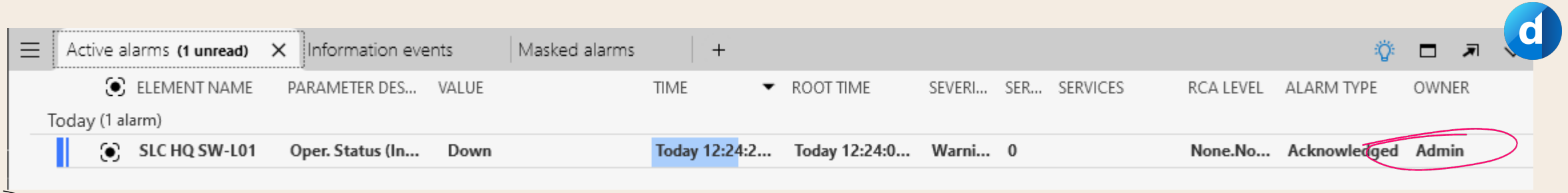


ChatOps Integration

Automatic notifications: take ownership of alarm

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

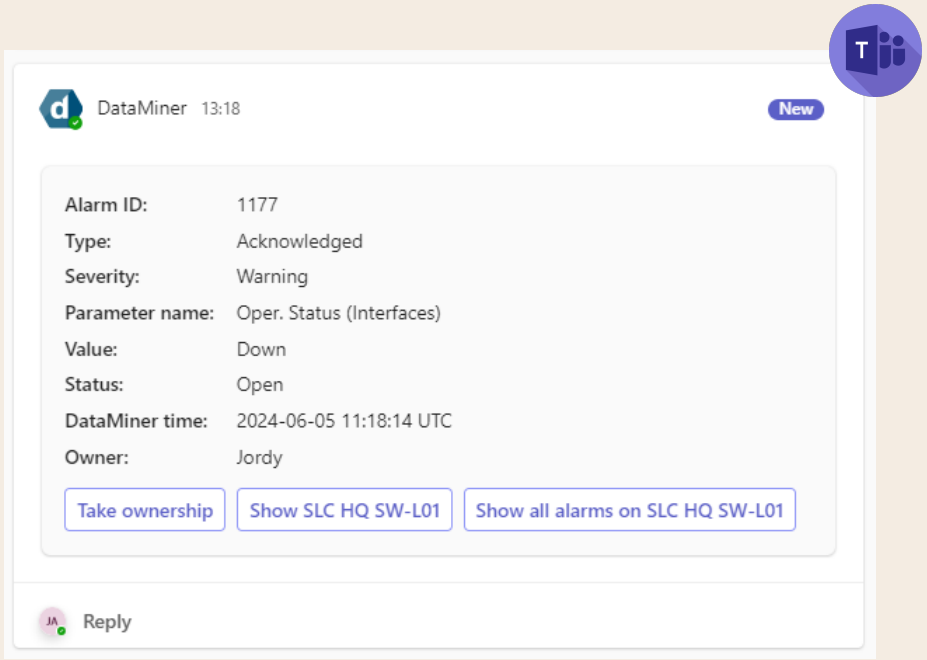




ChatOps Integration

Automatic notifications: take ownership of alarm

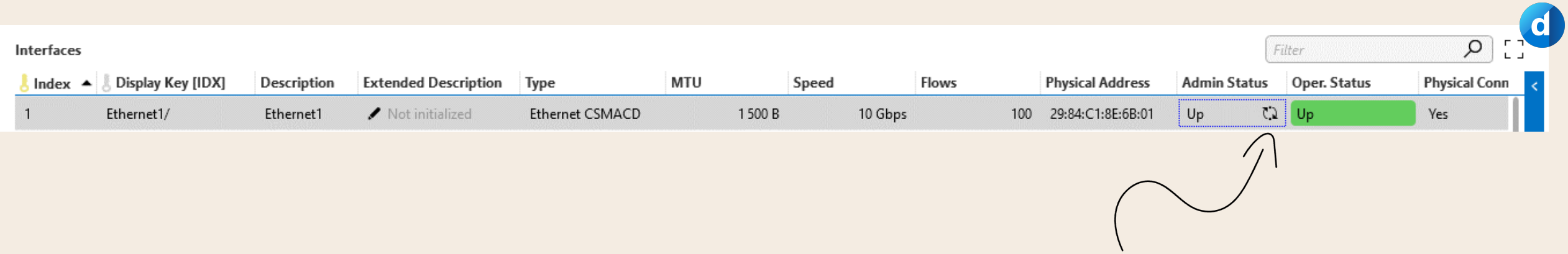
- Verify a new notification about taking ownership



ChatOps Integration

Automatic notifications: resolve alarm

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



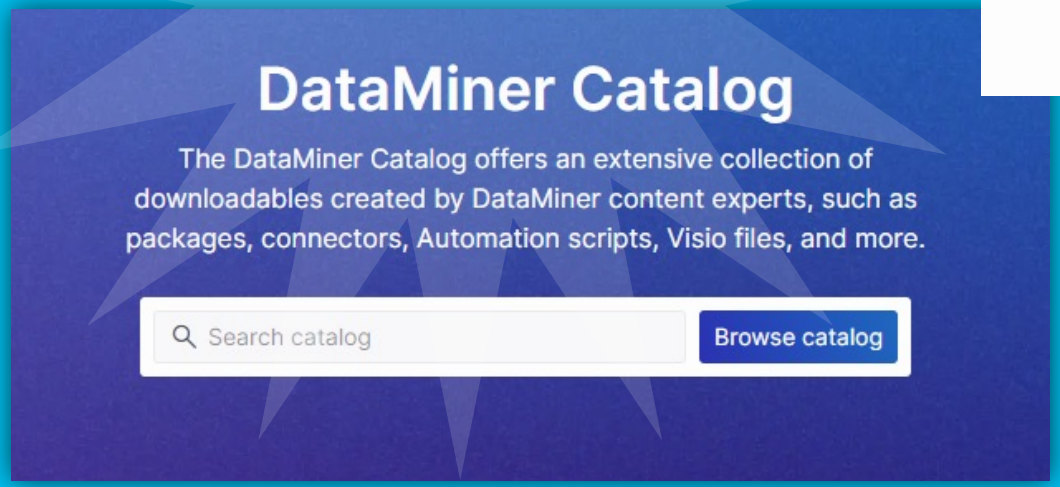
Let's go all the way!

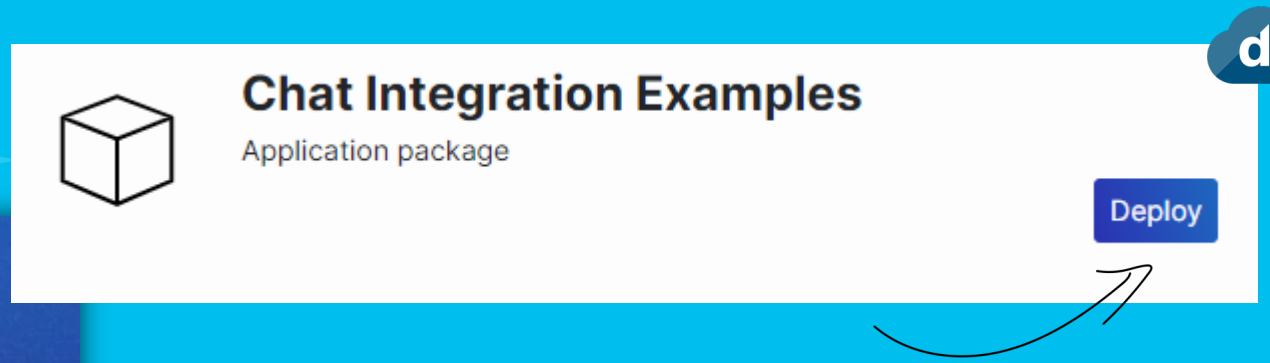
Create your first Chat Integration with DataMiner

50

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

empower!

Unlock GQI's

Full potential

GENERIC QUERY INTERFACE (GQI)

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

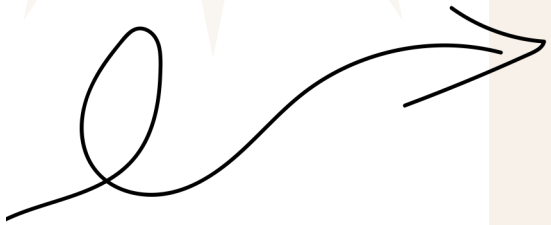
PRINCIPAL DEVOPS ENGINEER – DATA EXPLORATION

WIM.BRUYNOOGHE@SKYLINE.BE

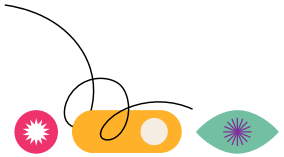
VISUAL OVERVIEW
DASHBOARDS
LOW-CODE APPS
GQI

WHAT'S ON THE MENU

Agenda



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



Goals

GQI Fundamentals

We understand the concept of GQI and queries

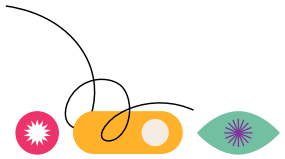
We can use data sources and operators

GQI Extensions

Understand why we sometimes need to extend GQI

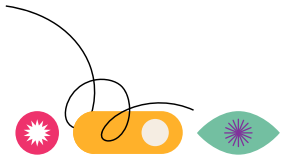
We can extend GQI by leveraging the Catalog

We understand how GQI Extensions work
(Optional)



What is GQI?

Ssssh, it's magic...



What is GQI?

The abstraction layer we needed

Generic Query Interface

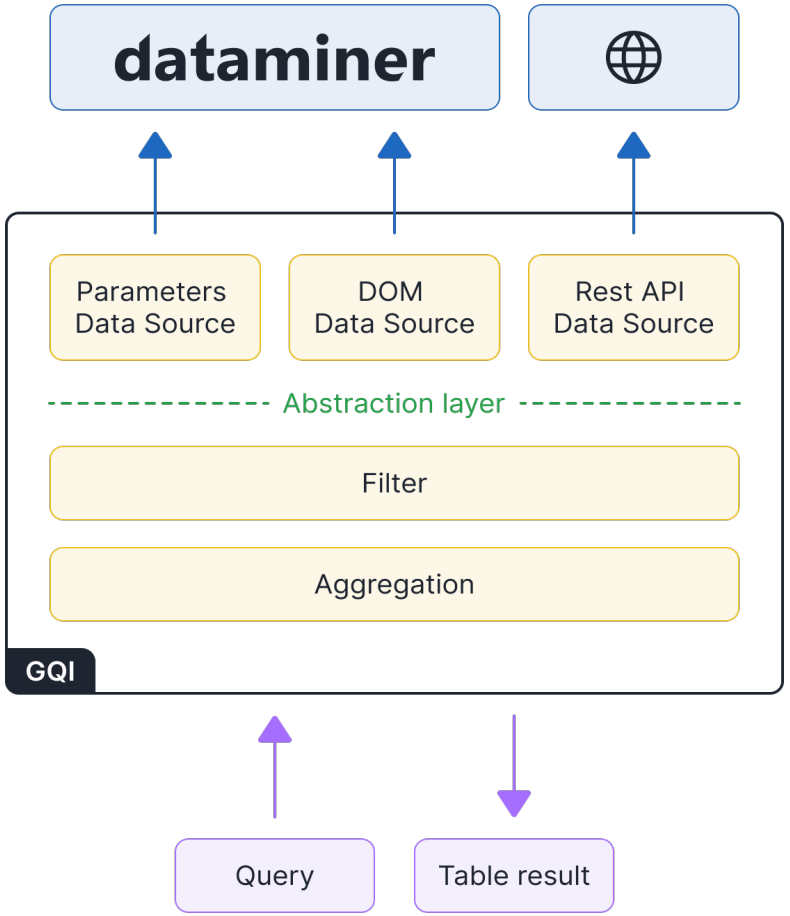
Retrieve and transform data from both inside and outside a DataMiner System

Why?

- Many diverse data sources
- Same operations and visualizations

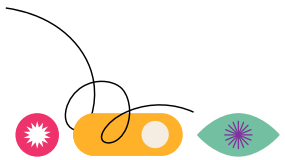
Solution

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



What are queries?

You talking to me?

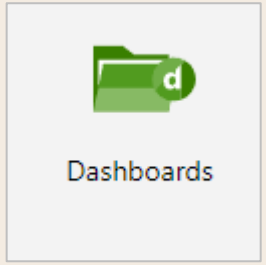


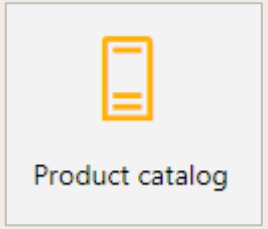
What are queries?

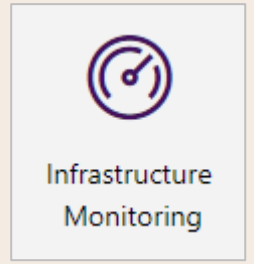
- Similarities with other querying languages
- Exists of
  - **One data source**
  - **Zero or more operators**
- Built through a **conversational API**
- Stored in your dashboard or Low-Code app

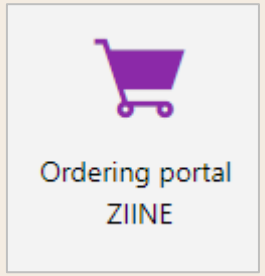
```
SELECT *
FROM Alarms
WHERE Severity
LIKE '%Warning%'
```

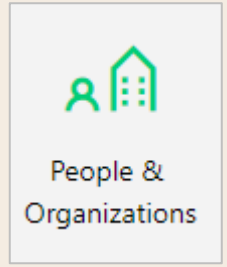
```
SELECT Severity, Count(*)
FROM  Alarms
GROUP BY Severity
```











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

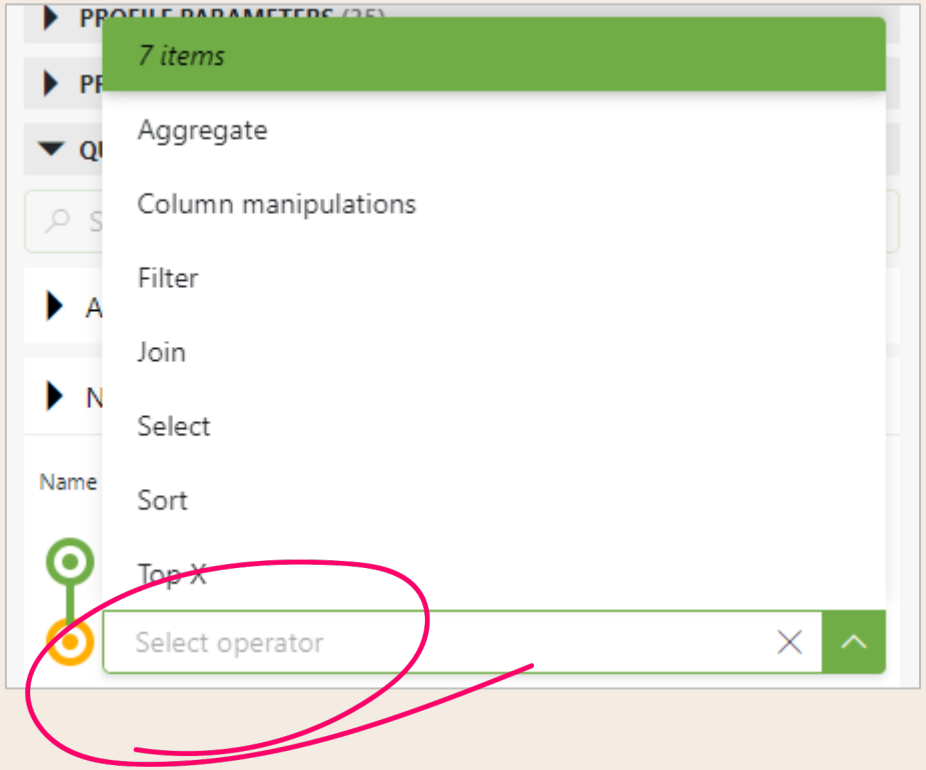
Database

File storage
(CSV, JSON, XML)

What are queries?

Operators you say?

Chained operators that apply transformations to our data source

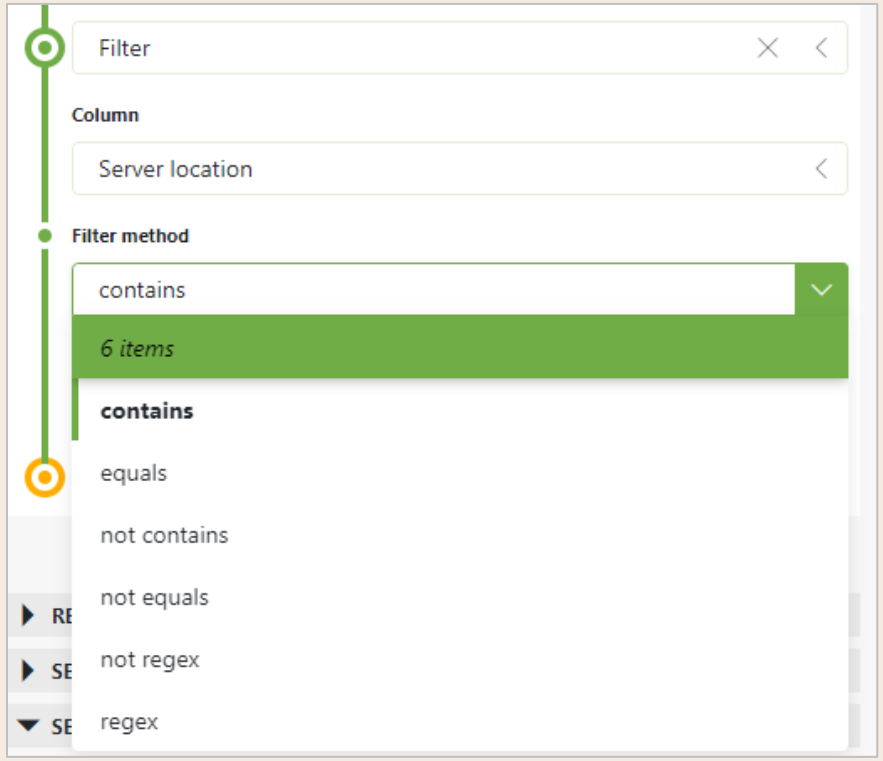


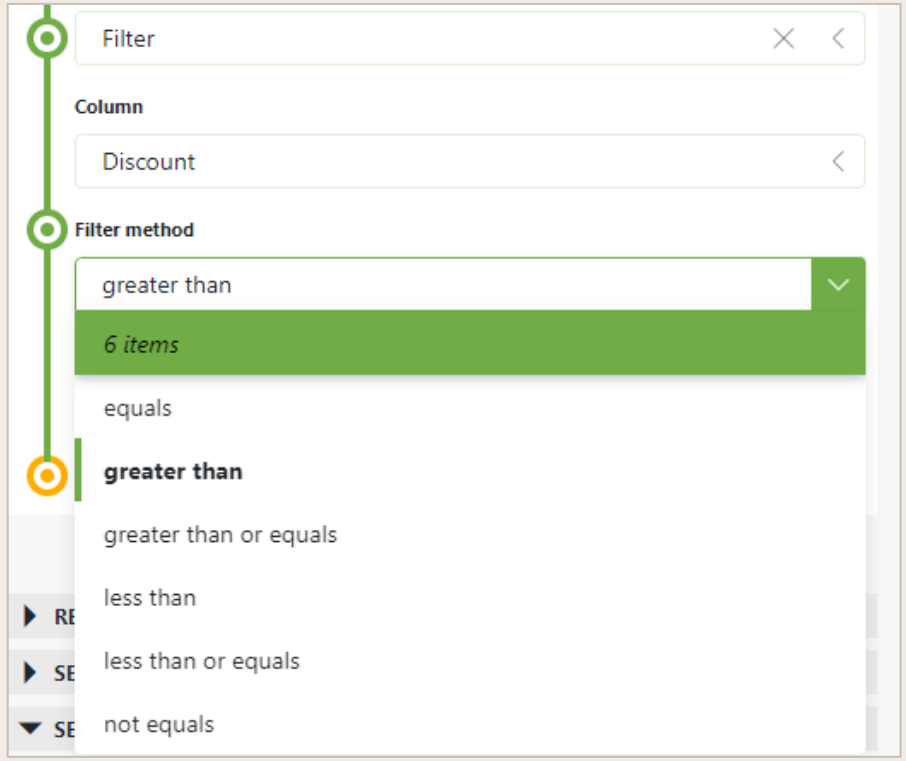
What are queries?

Conversational, my new best friend?

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

Text

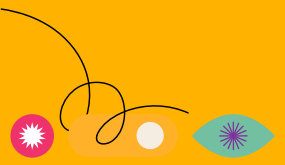




Numeric

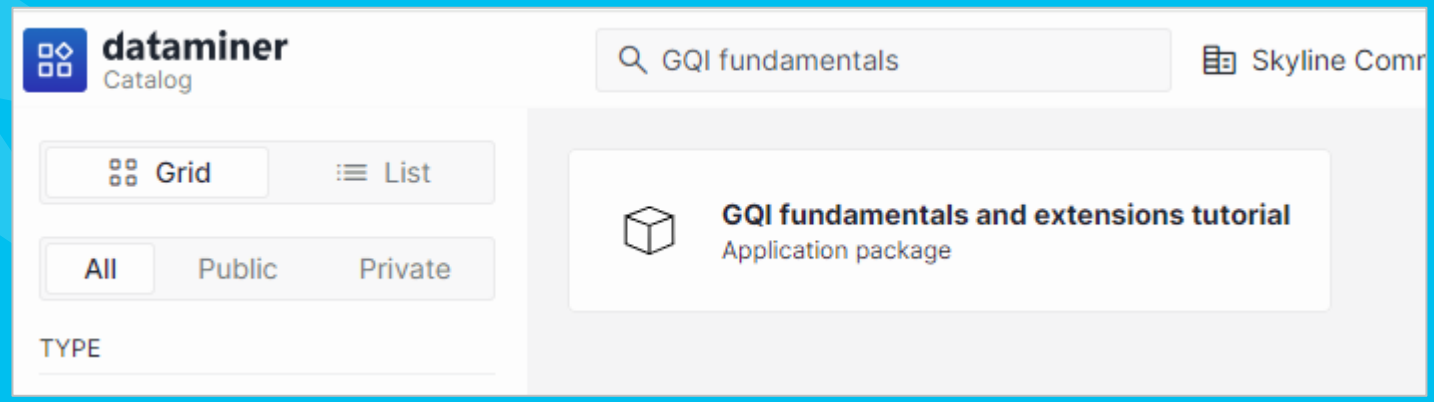
Let's have a look

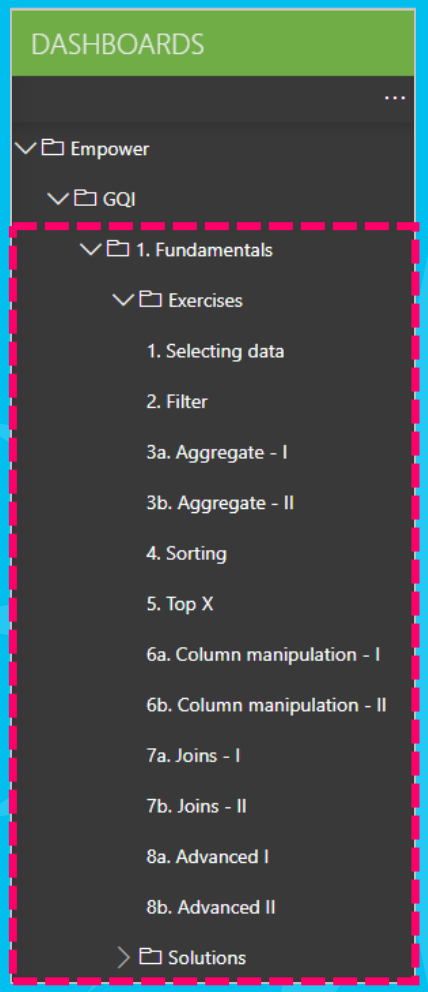
We understand the concept of GQl and queries.



Hands-on time!

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





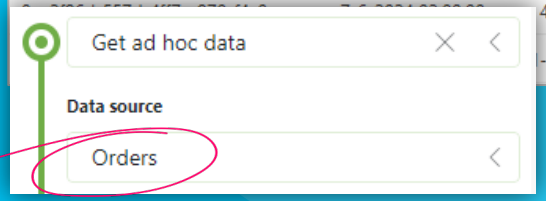
Let's get our hands dirty!

Fundamentals exercises

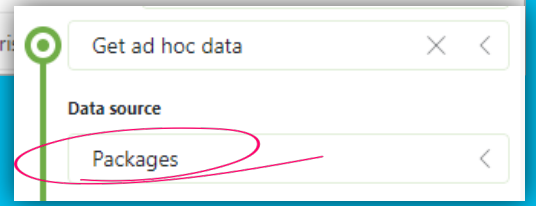
We can use data sources and operators.

The data

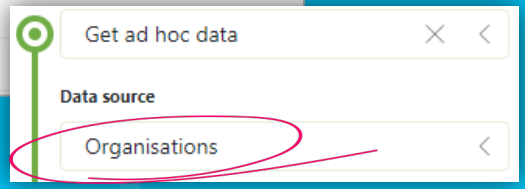
ID	START	END	STATE	PACKAGE ID	CUSTOMER ID	SERVER LOCATION	LAST MINUTE	DISCOUNT
5f226aaa-bae9-456b-818f-dc4...	12-10-2024 02:00:00	20-10-2024 02:00:00	New	510e2e25-c131-4a53-b0e5-cc4a2...	4fed1c0a-445d-4d1f-92fe-06d25...	Europe		2%
01f2693a-1a71-4137-a439-f07...	27-4-2024 02:00:00	19-5-2024 02:00:00	Complete	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%



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	PrestigeEnterpri		

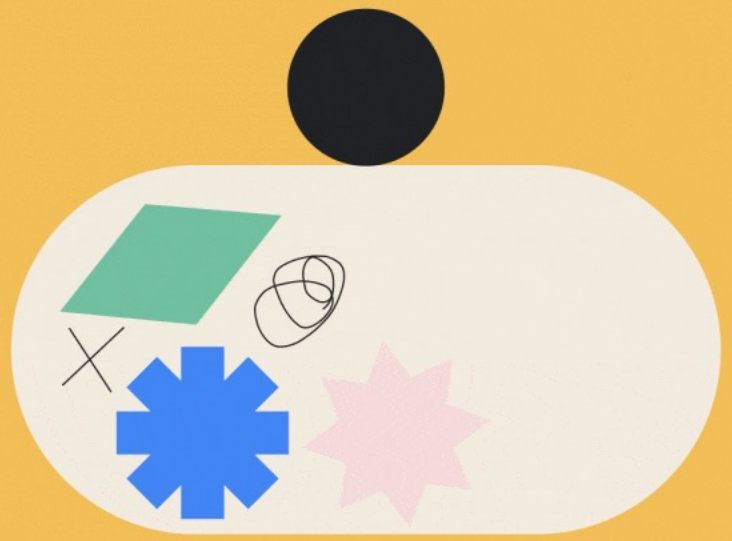


ID	NAME
4fed1c0a-445d-4d1f-92fe-06d25a04d5d9	Skyline Communications
d59cb576-3097-4411-93c1-99d3e1d34ed0	LAWO
de2217c1-df4c-46e7-b103-c60c9d77a174	Ziine



SEE YOU IN **5** MINUTES

Break



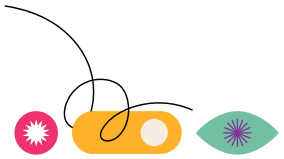
empower!

GQI extensions

Why should we extend GQI?

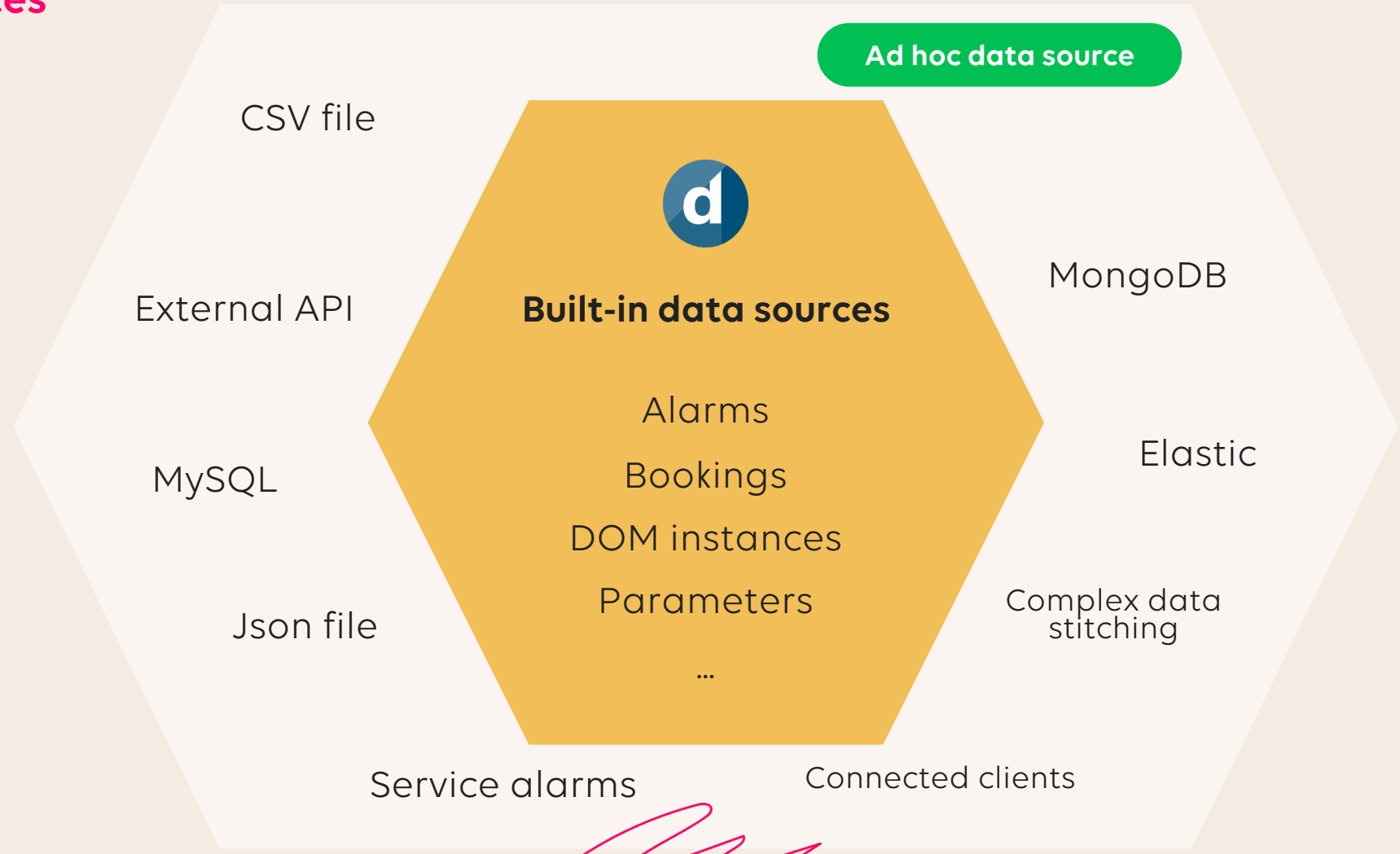
Ad hoc data source

Custom operator



Why extend GQI?

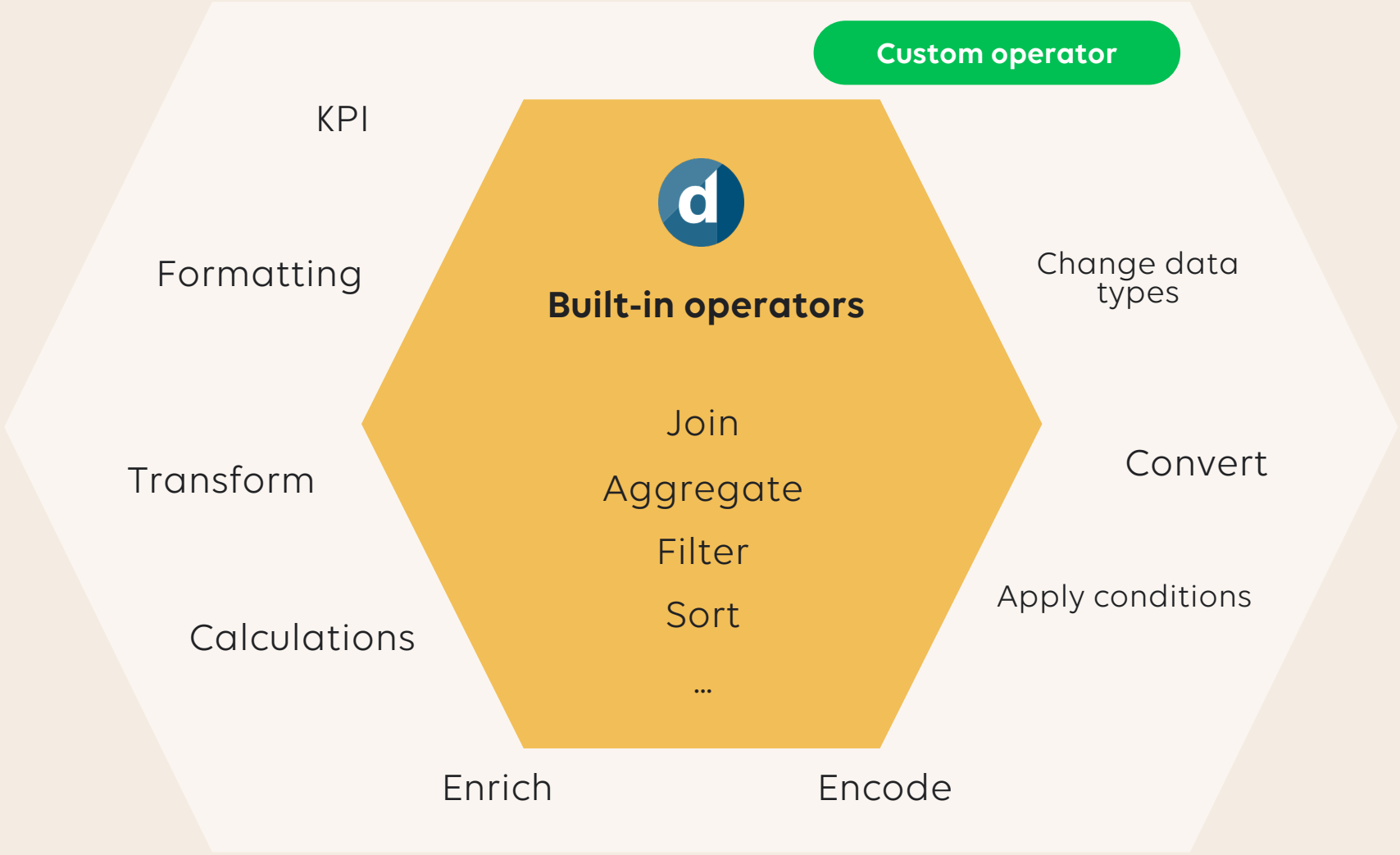
Data sources



Understand why we sometimes need to extend GQI

Why extend GQI?

Operators

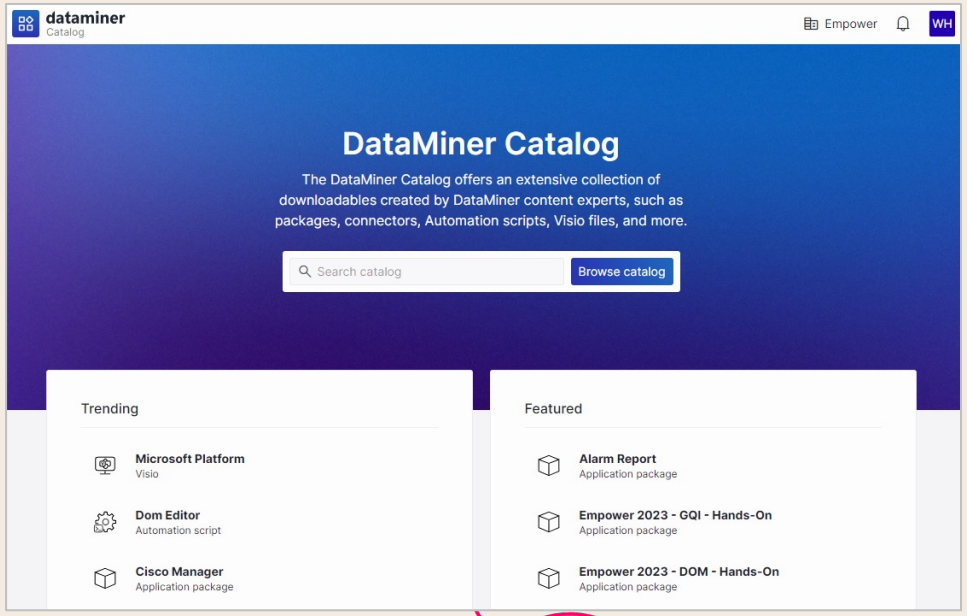


Understand why we sometimes need to extend GQI

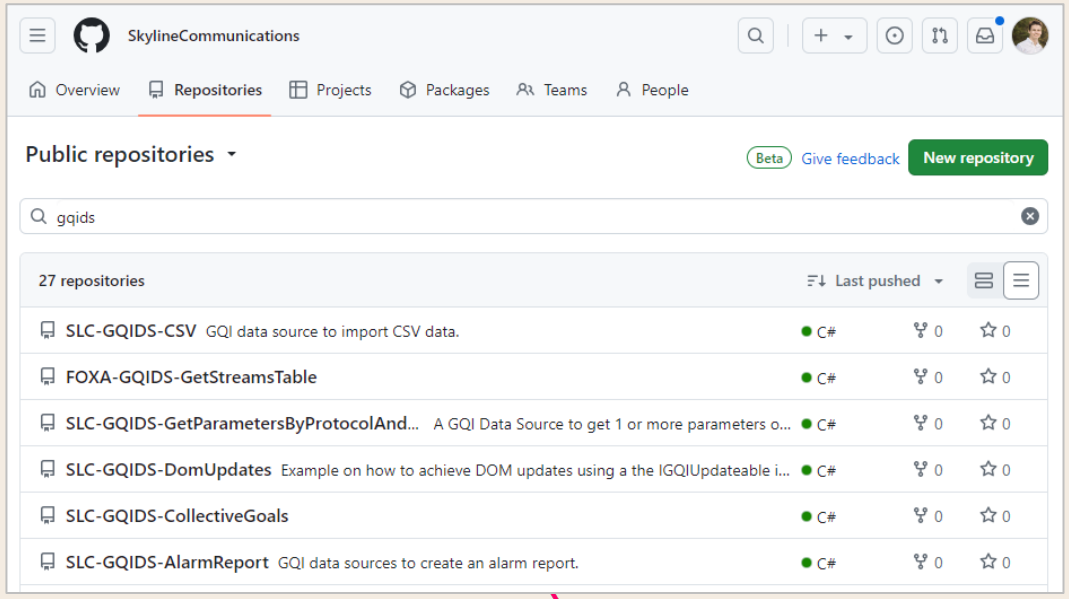
But, how?

Reuse existing extensions

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



catalog.dataminer.services



Github as source control

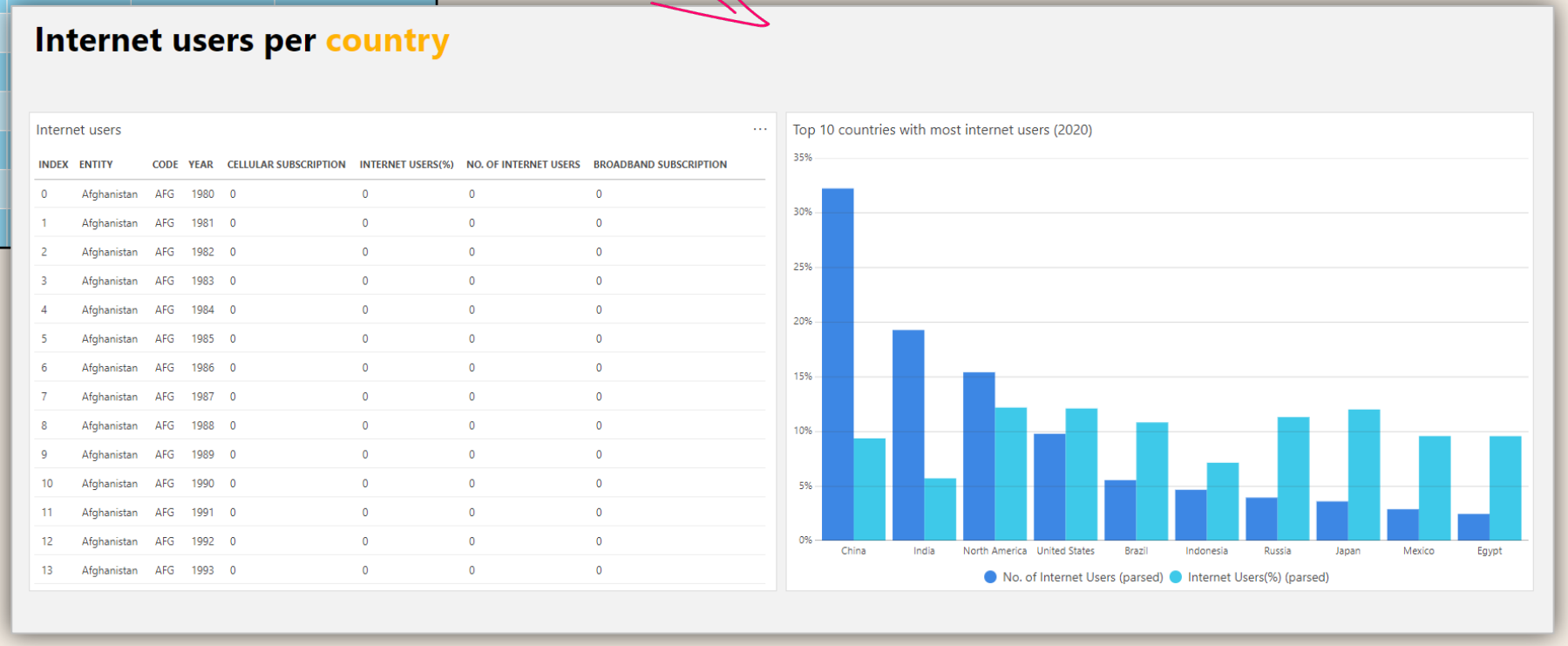
From CSV file to dashboard

Isn't it great?

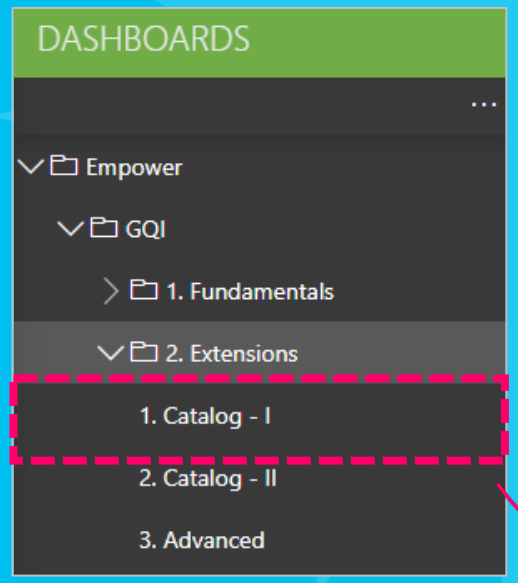
Index	Entity	Code	Year	Cellular Subscription	Internet Users(%)	No. of Internet Users	Broadband Subscription
0	Afghanistan	AFG	1980	0	0	0	0
1	Afghanistan	AFG	1981	0	0	0	0
2	Afghanistan	AFG	1982	0	0	0	0
3	Afghanistan	AFG	1983	0	0	0	0
4	Afghanistan	AFG	1984	0	0	0	0
5	Afghanistan	AFG	1985	0			
6	Afghanistan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

Internet-users.csv

Dashboard



Let's get our hands dirty!



Catalog - I

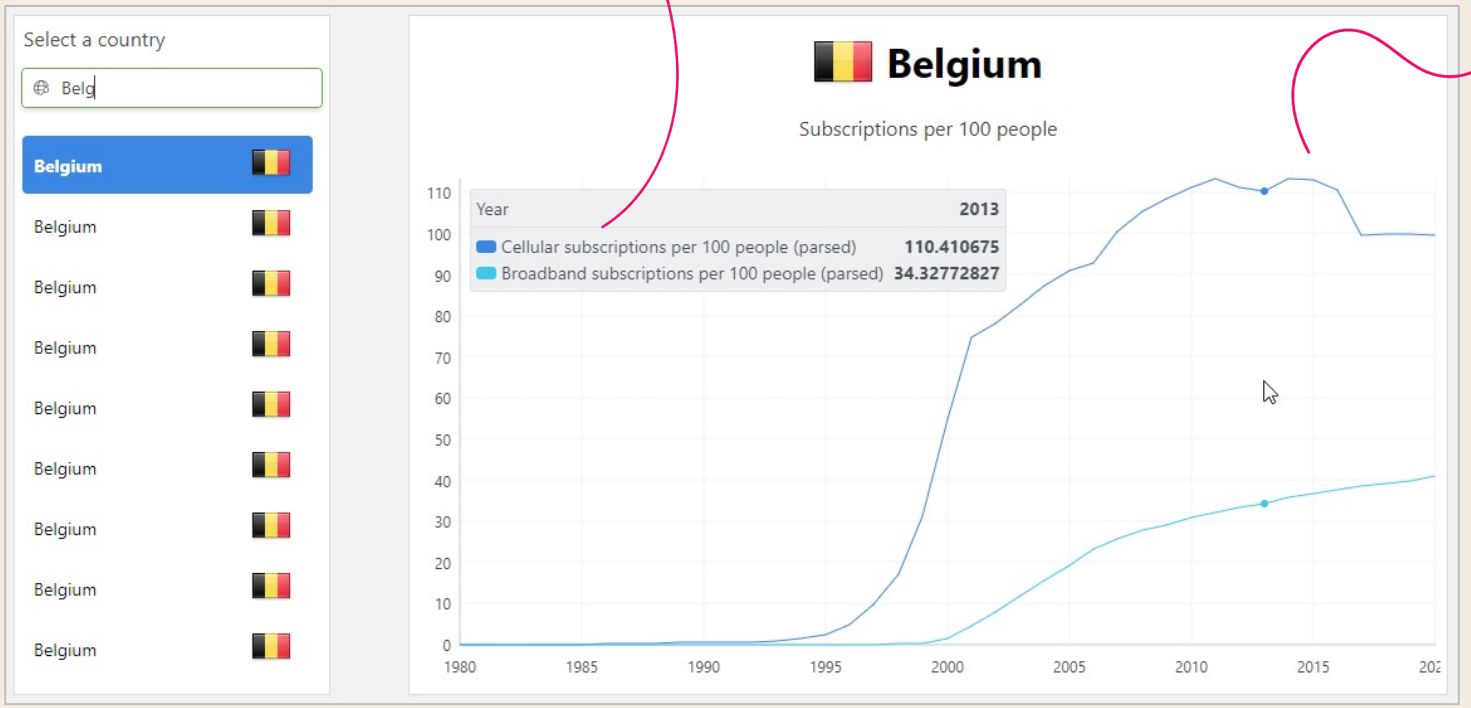
We can extend GQI by leveraging the Catalog

Let's improve an existing dashboard

Exercise

Improve labels

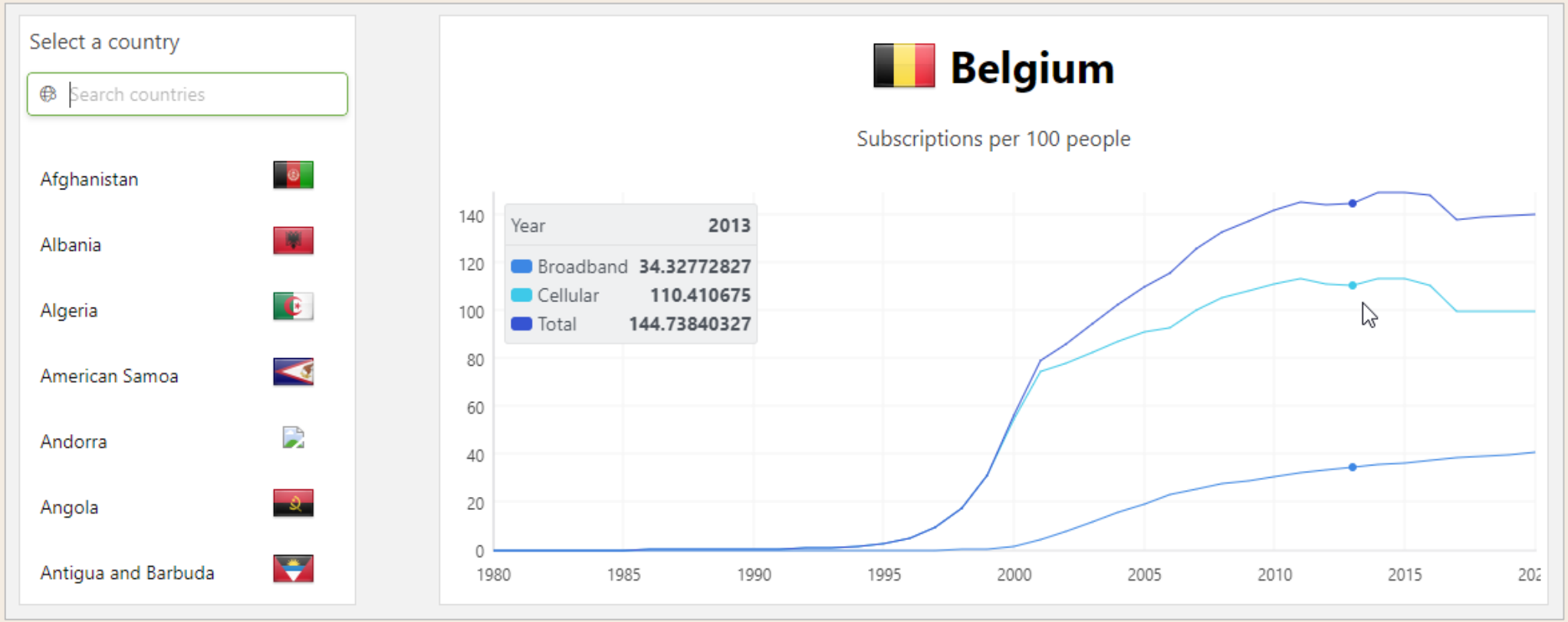
Add another line for total



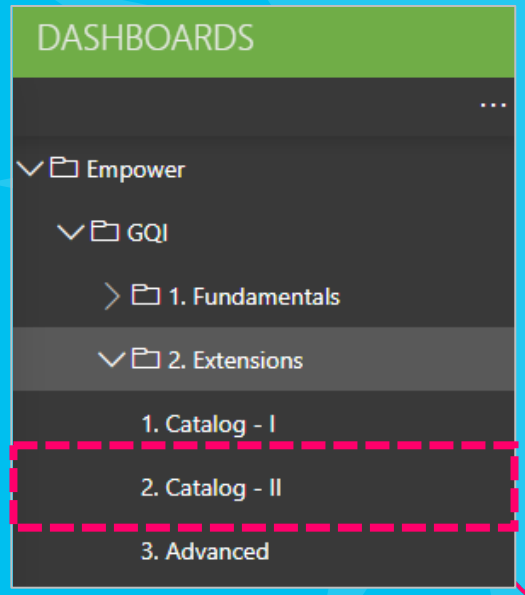
Avoid duplicates

Let's improve an existing dashboard

Result



Let's get our hands dirty!

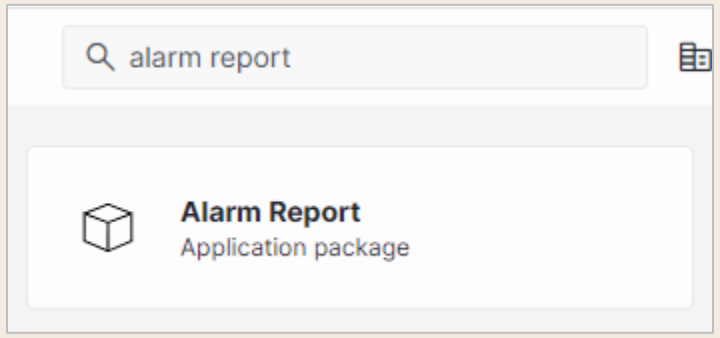


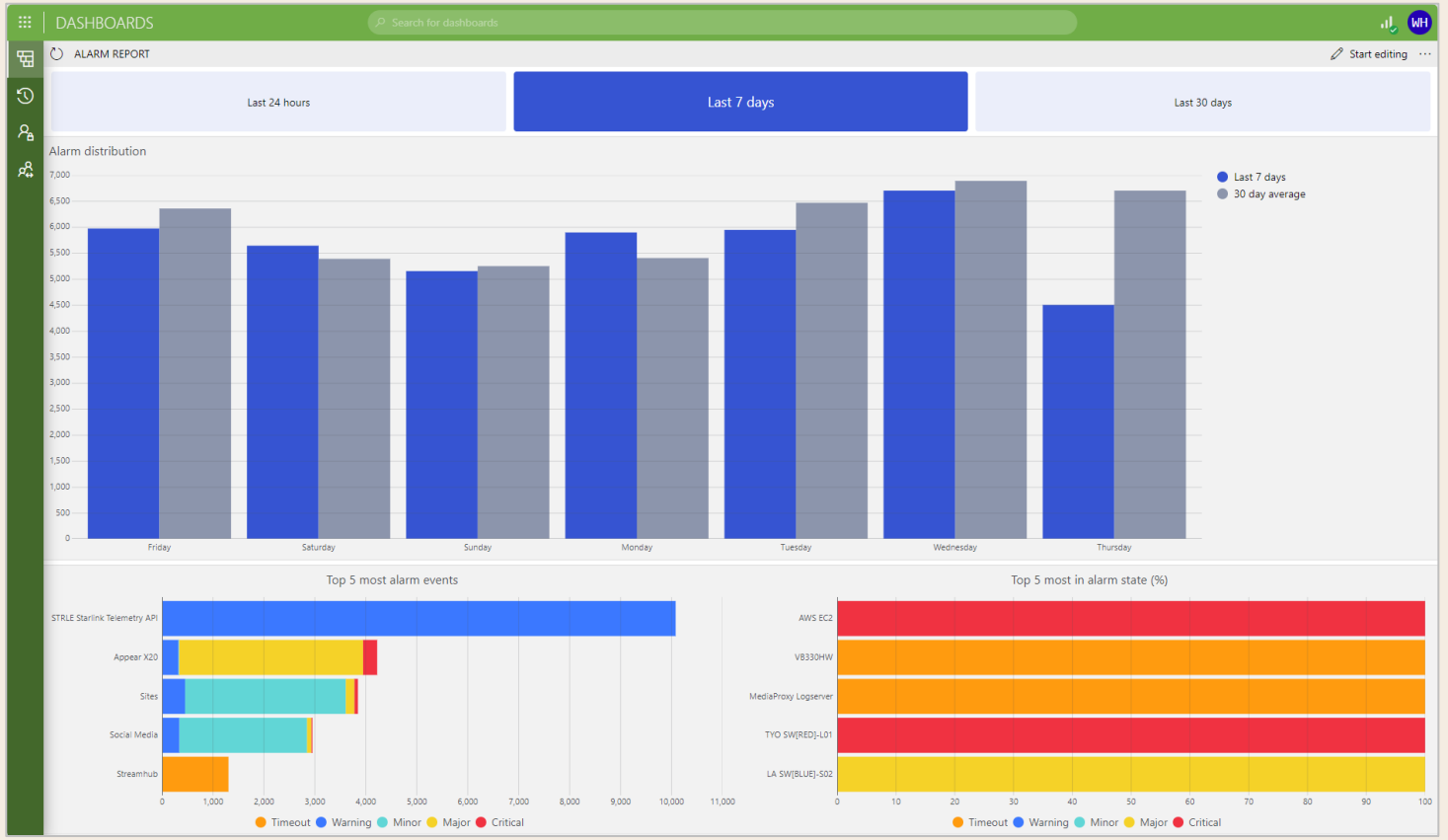
Catalog - II

We can extend GQI by leveraging the Catalog

Alarm report

Available from the catalog

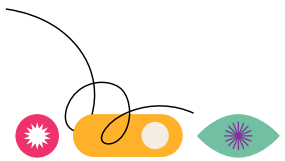




Creating our own extensions

Advanced

Exploring the possibilities



Extending GQI

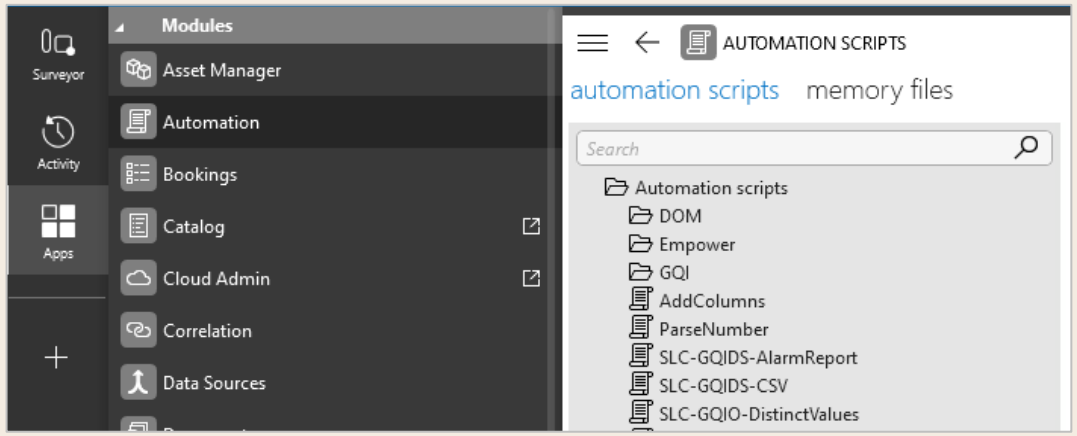
Advanced

How does that work?

Ad hoc data source

Custom operator

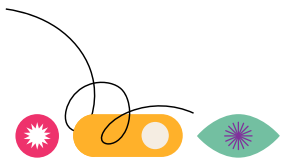
- C# Code
- Compiled as library (DLL) through Automation script module
- Source code visible in Cube



The ad hoc data source

Advanced

Expose ANY data from any place, just in time



Advanced

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, …

DOCS

Ad hoc data source

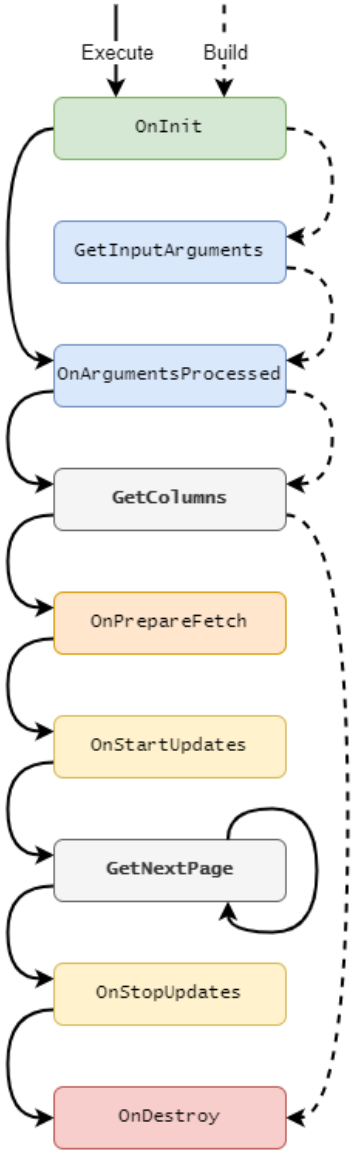
Advanced

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



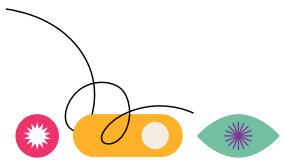
Let's have a look

GET INSPIRED

The custom operator

Advanced

Massage the data in my own special way



Advanced

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#)

DOCS

The custom operator

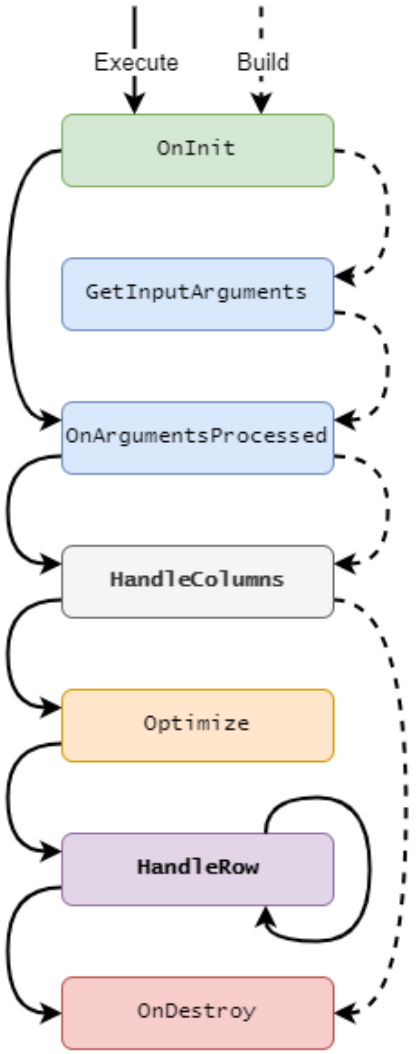
Advanced

How does it work?

1 custom operator = 1 C# class

Implement interfaces to add functionality

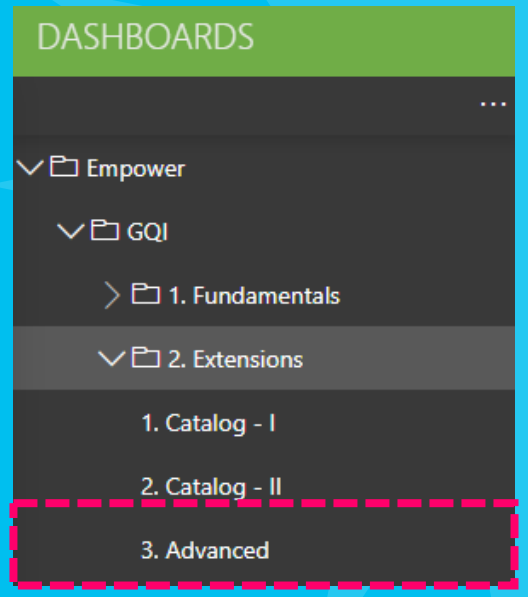
- **IGQIColumnOperator** Required *
  - Add, delete or modify columns
- **IGQIRowOperator** Required *
  - Read cell values, modify cells values or delete rows
- **IGQIInputArguments**
  - Define and receive external inputs
- And more

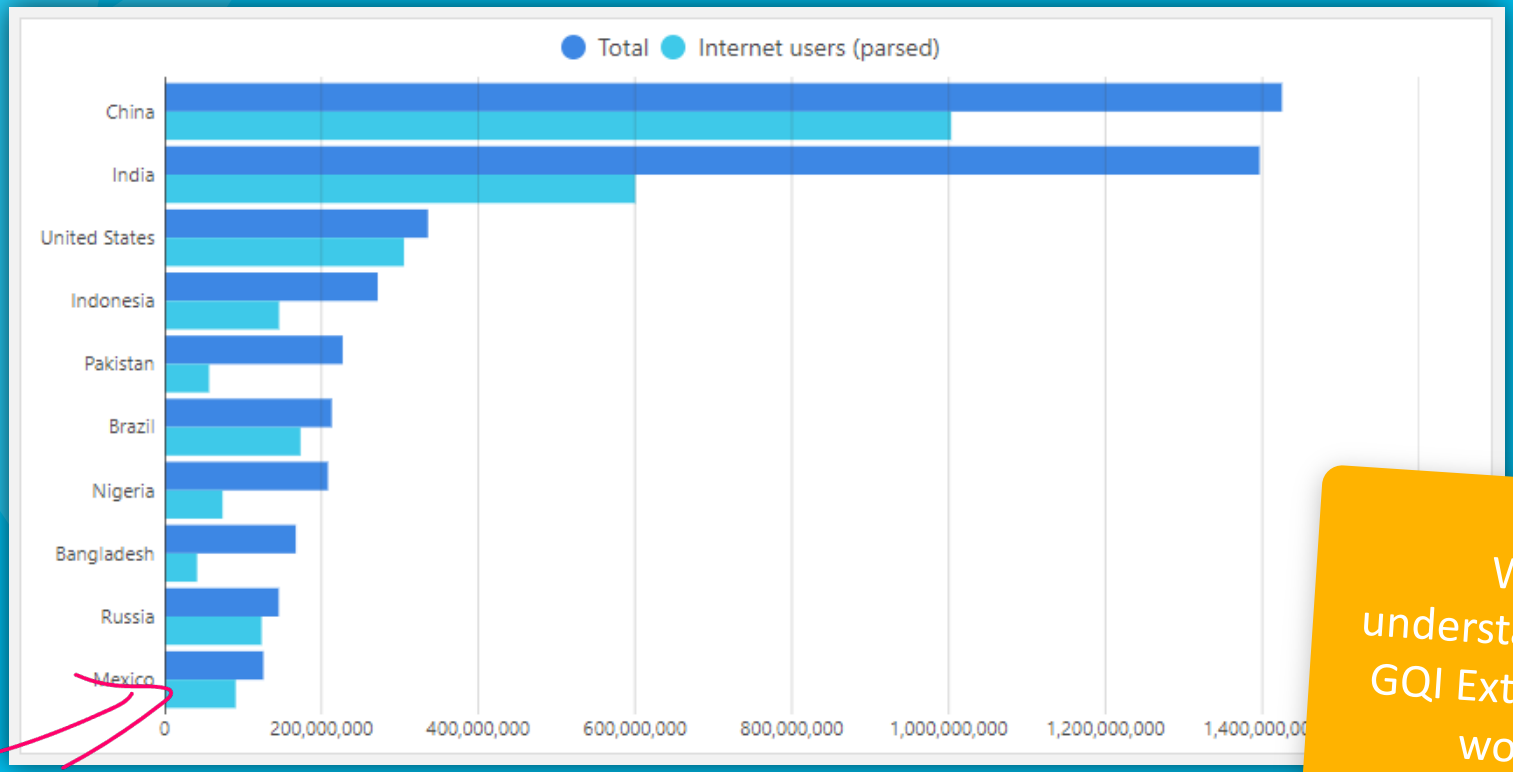


Let's have a look

GET INSPIRED

Let's get our hands dirty!



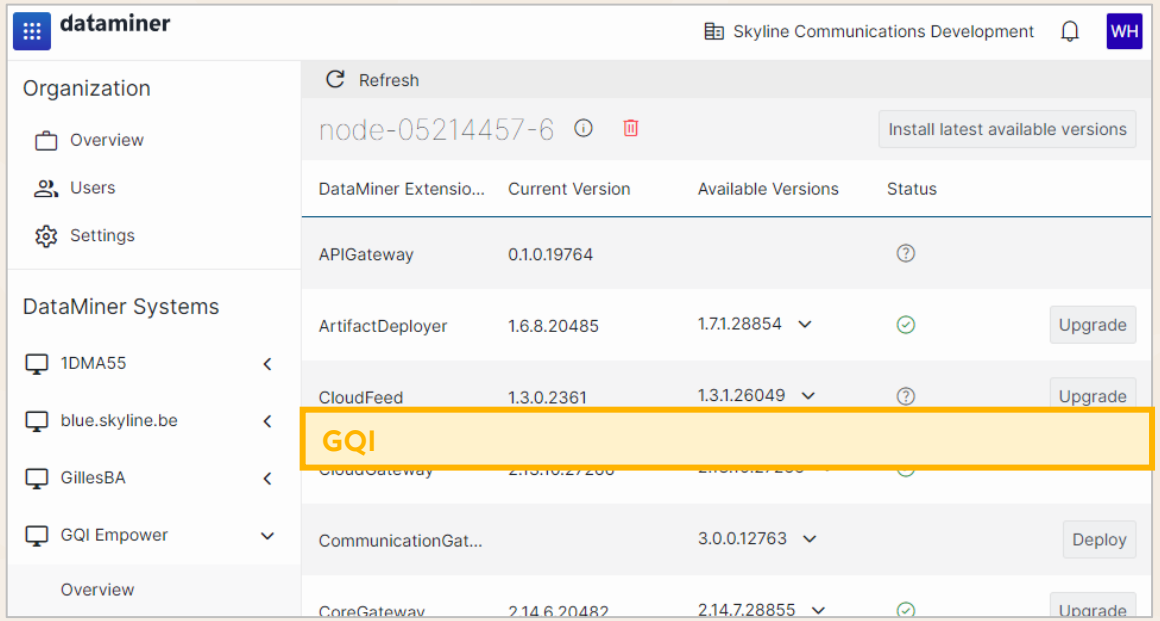


We understand how GQI Extensions work.

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



admin.dataminer.services

The learning journey continues

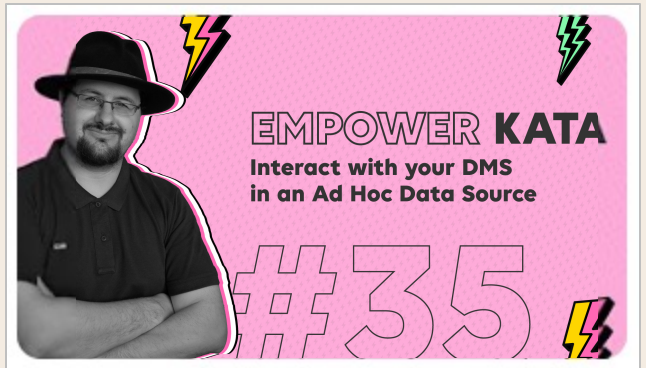
There is more

Build your first Generic Query Interface (GQI) - #Kata 4 (Bringing the Thunder)

Transform data with Generic Query Interface (GQI) - #Kata 5 (Bringing the Thunder)

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

COMING SOON



Interact with your DMS in an Ad Hoc Data Source - #Kata 35 (Bringing the Thunder)

Interact with the DMS in an ad hoc data source

ASK AWAY

empower!

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

MICHIEL.SAELEN@SKYLINE.BE

YOUR HOST

Joey Vanhalst

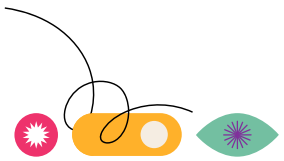
ENGINEERING MANAGER

JOEY.VANHALST@SKYLINE.BE

WHAT'S ON THE MENU

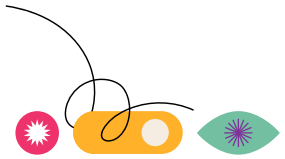
Agenda

- 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

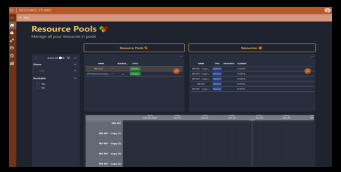


dataminer.MediaOps

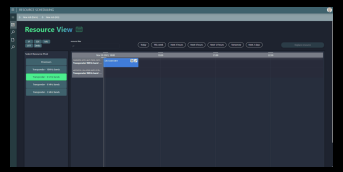
Digital operations : data driven, simplified and automated operations

BaM AWARDS 2024 WINNER NABSHOW Where Content Comes to Life

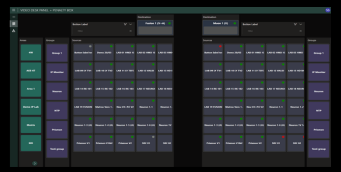
Example applications:



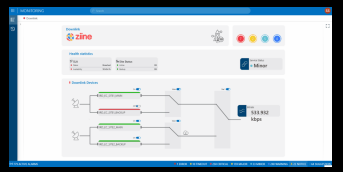
RESOURCE STUDIO



SCHEDULING



CONTROL SURFACE



MONITOR

COSTING & BILLING

API

INVENTOR — PLAN — RESERVE

MediaOps.PLAN

DEPLOY — CONFIGURE — CONNECT — CONTROL — MONITOR — QoS QoE

MediaOps.LIVE

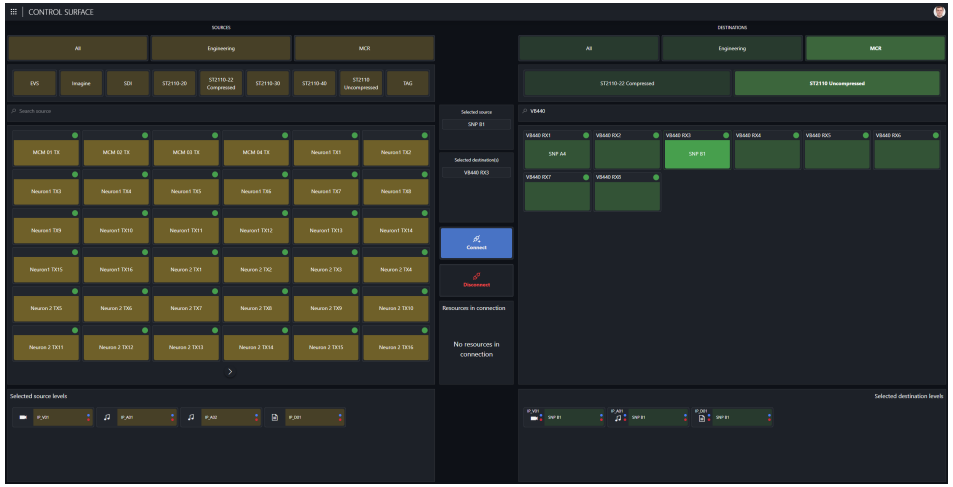
FINISH — COST & BILL

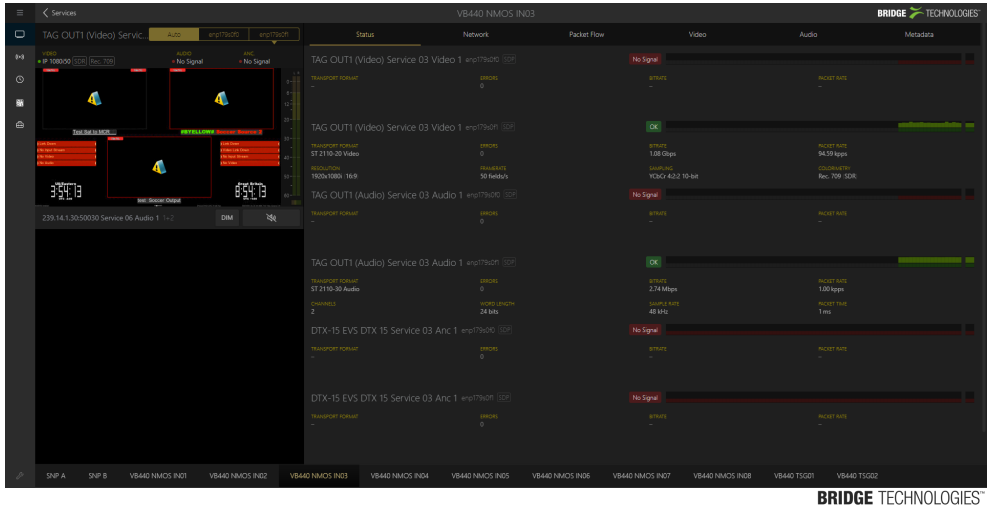
MediaOps.PLAN

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

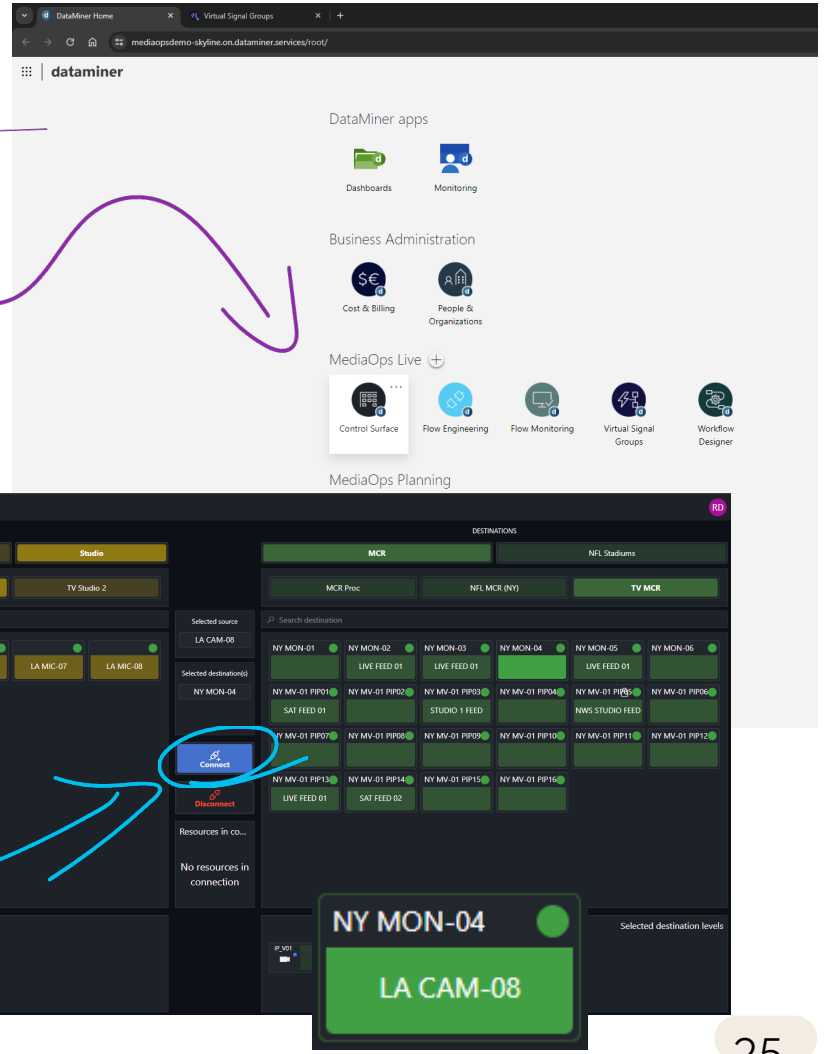
Getting hands-on with the apps

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

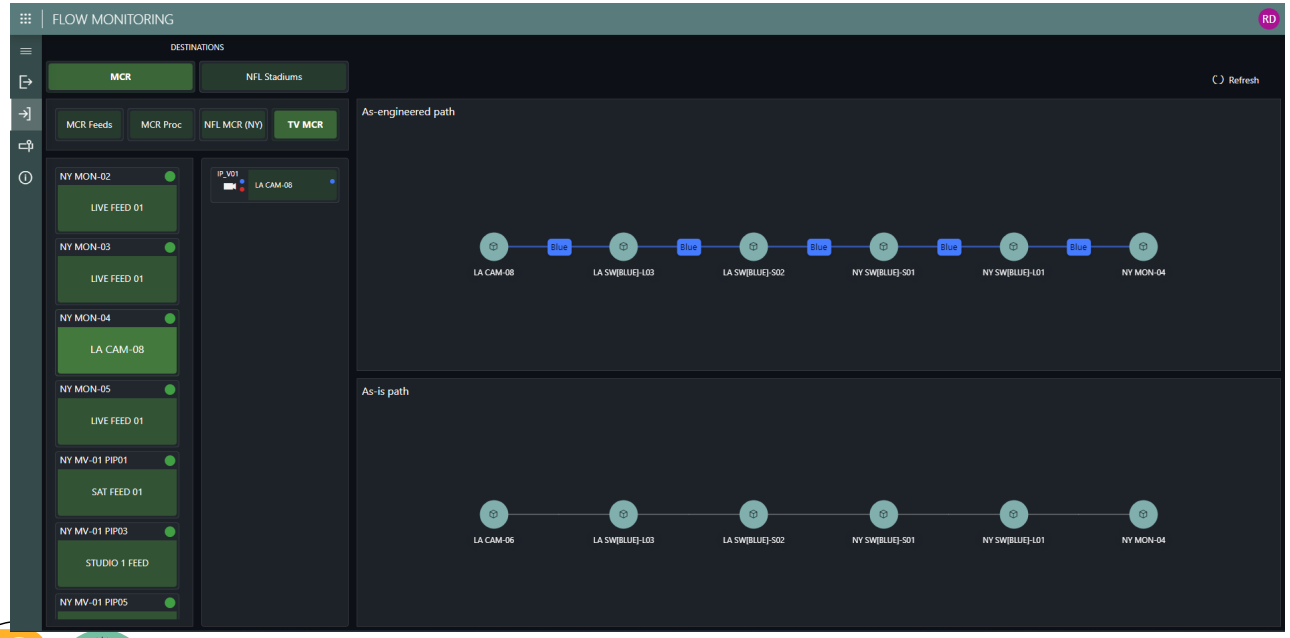


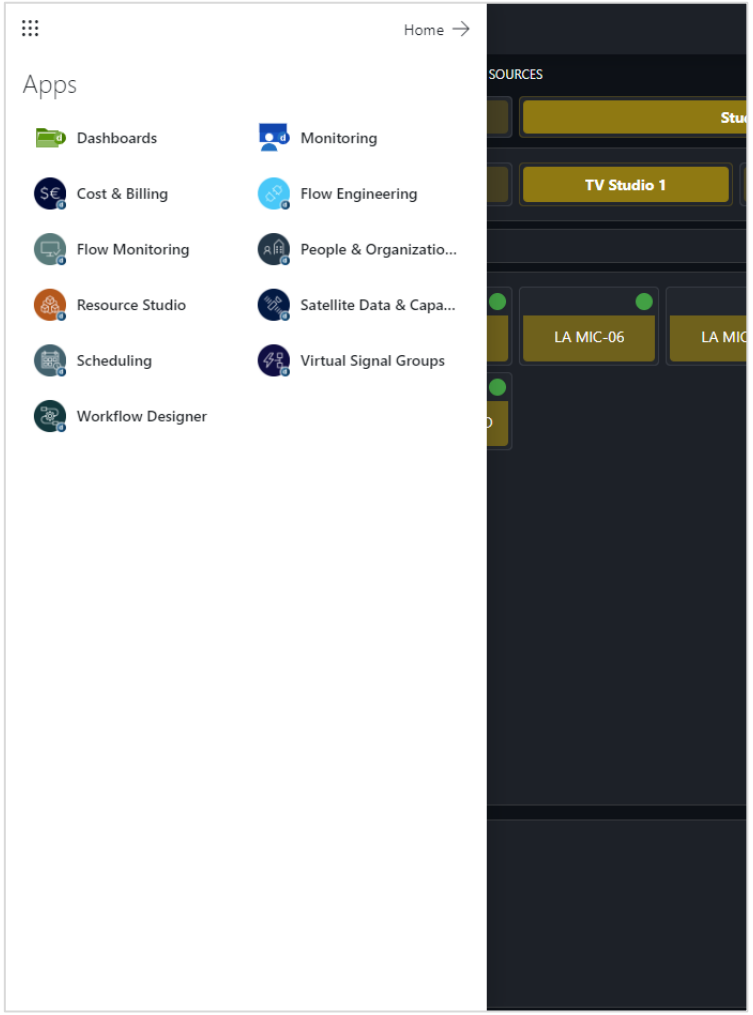
Flow Monitoring

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

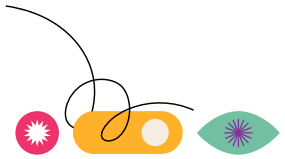
exercise

- 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

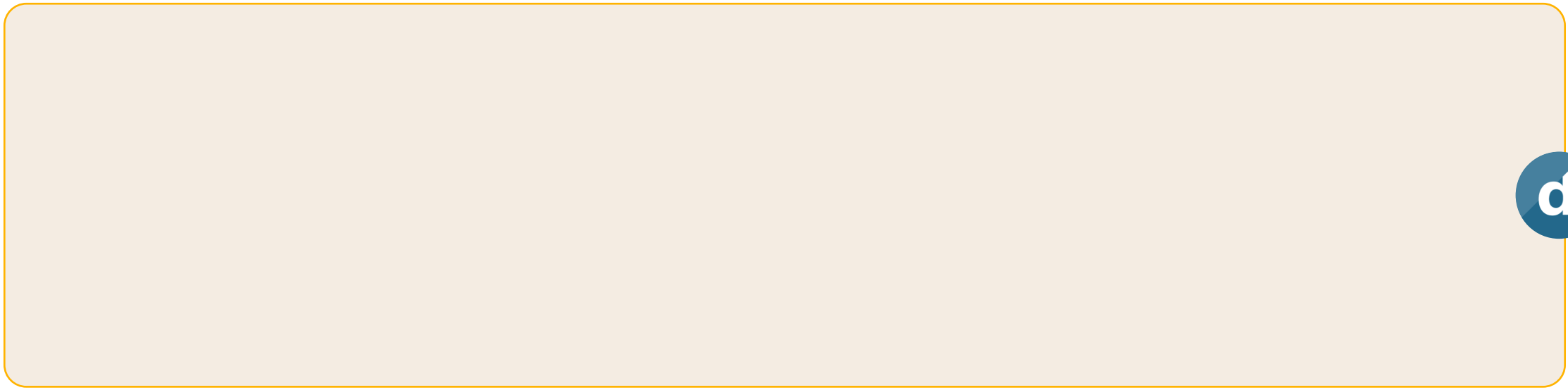
Deep dive

Build up together how the system works in the background

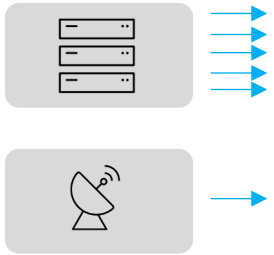


DataMiner MediaOps LIVE

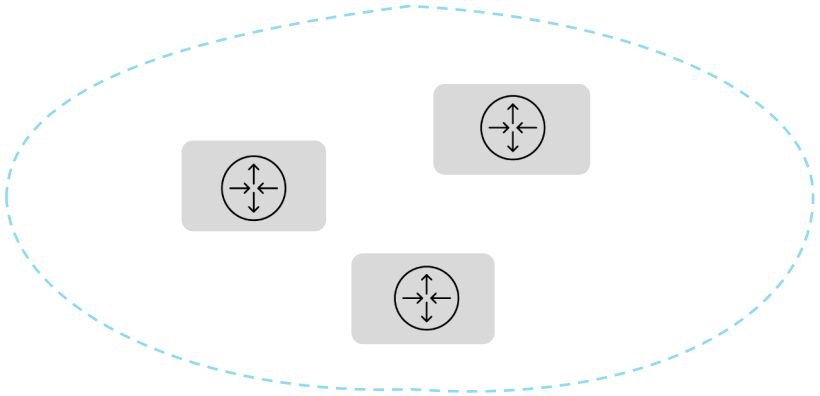
High-level picture



Example:
1x SMPTE ST 2110-20 video sender
1x SMPTE ST 2110-30 audio sender



Sources

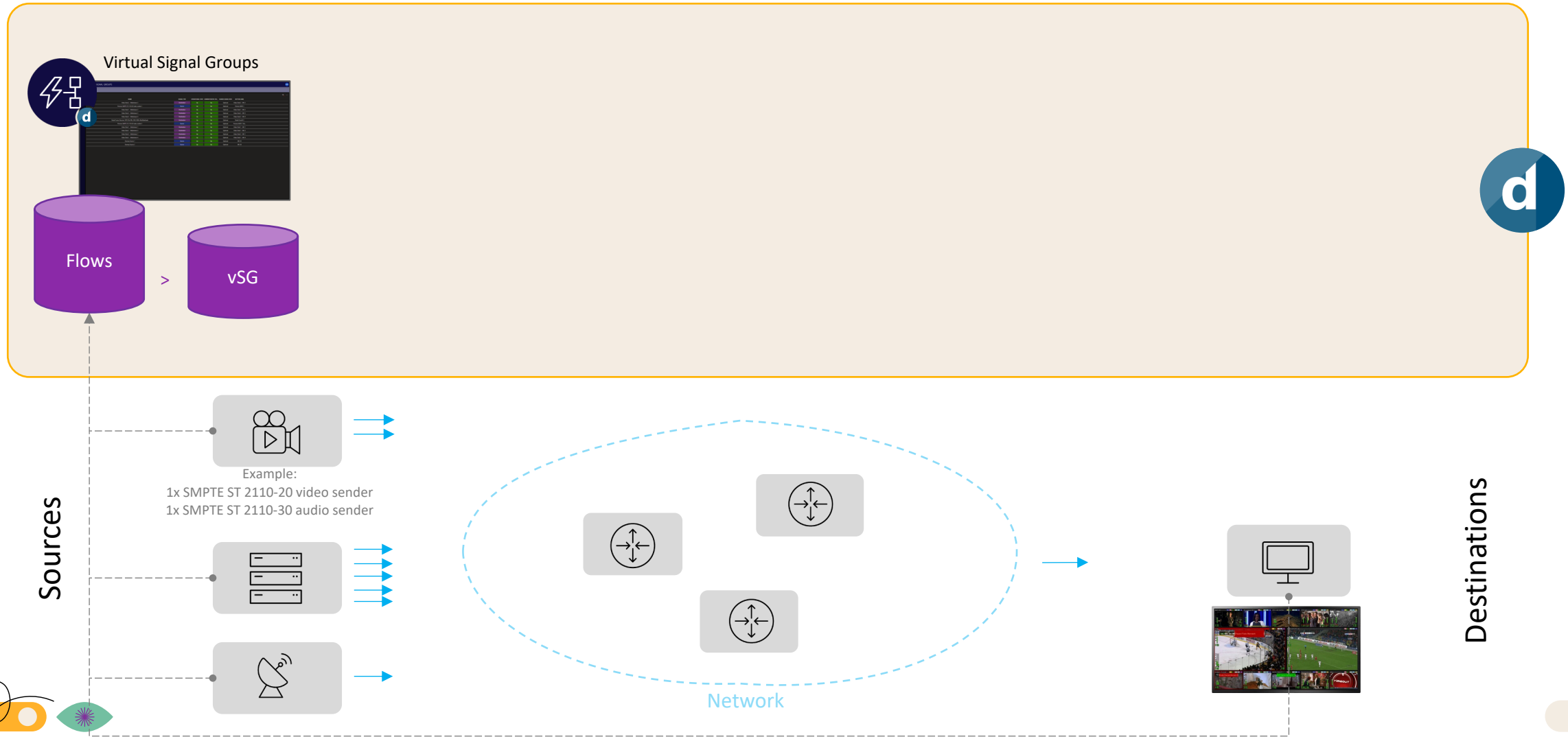


Network

Destinations

DataMiner MediaOps LIVE

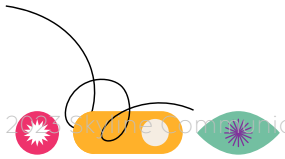
High-level picture

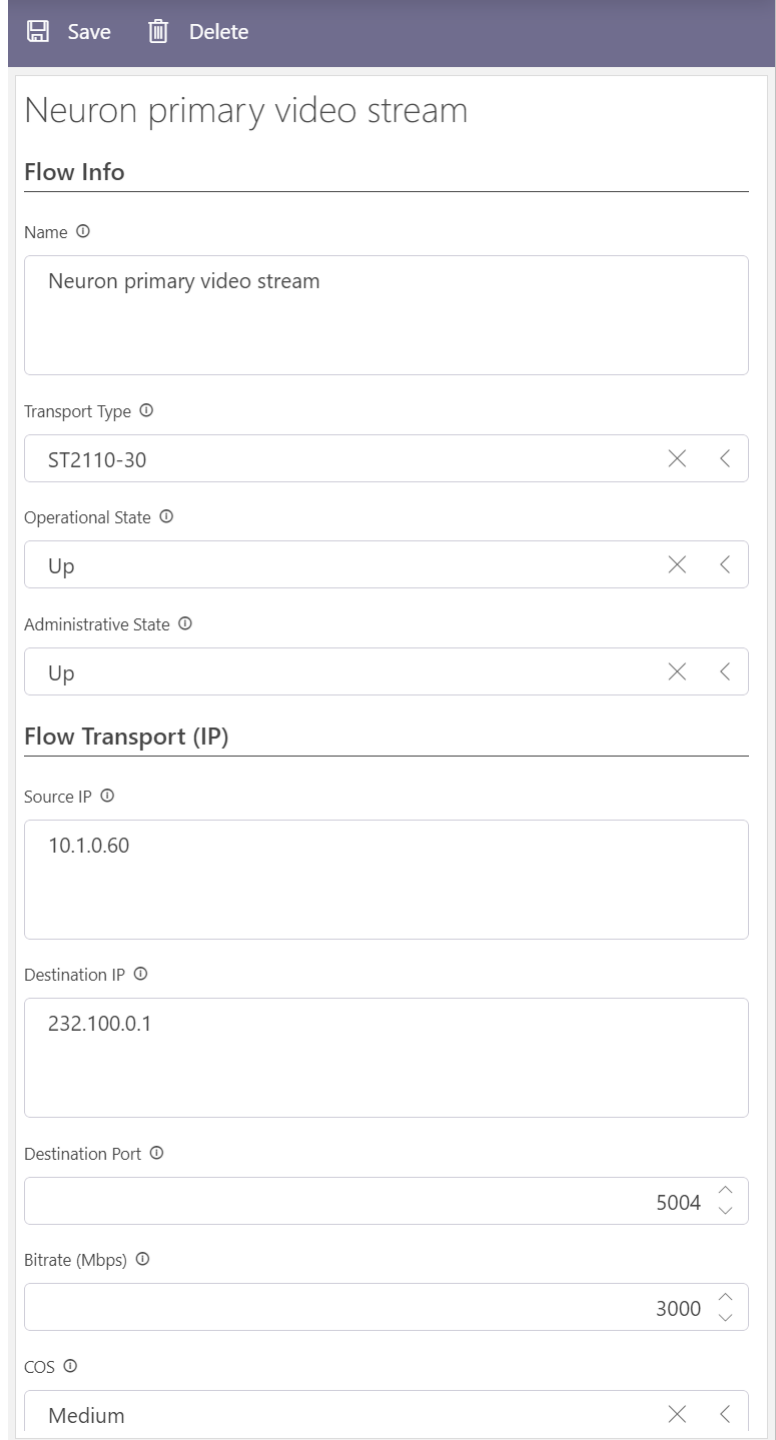


Flows

Open database of flow senders & flow receivers

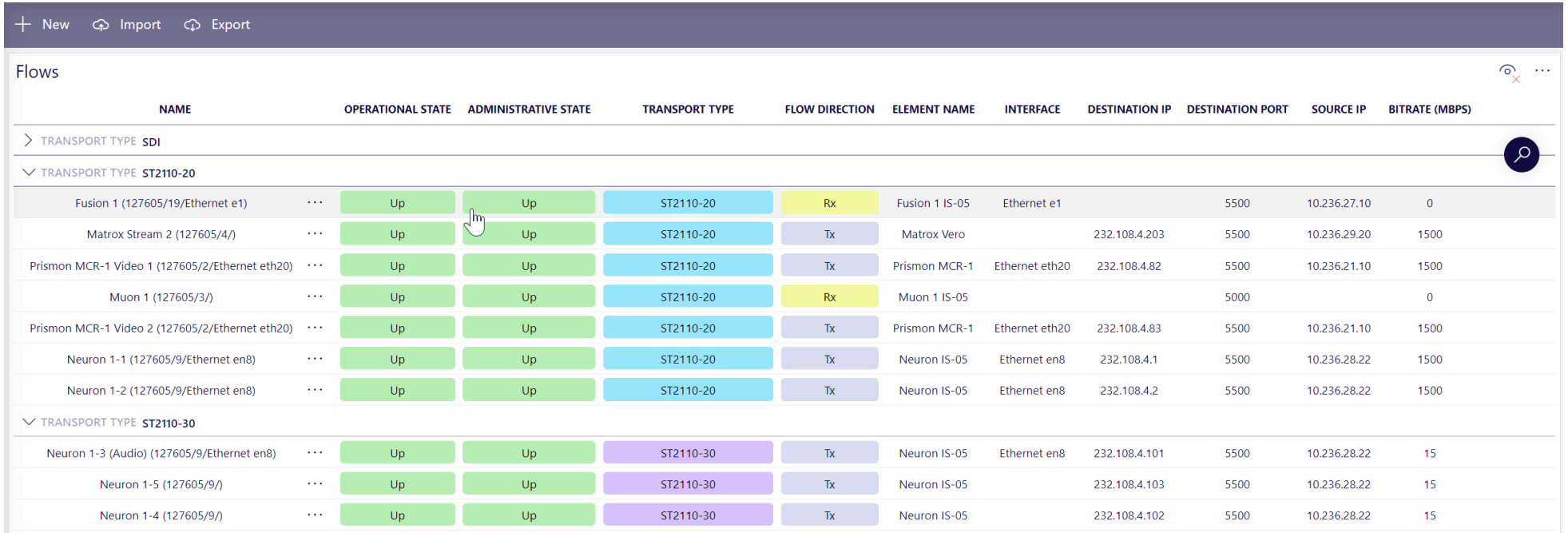
- Flows are elementary streams of video, audio and/or data
- Supports multiple network technologies :
  - IP (2110-20, 2110-30, 2022-6…)
  - SDI, ASI, L-Band, SDH, …
  - MPLS, pseudowire, VLAN, .. *
  - Internet transport RIST, Zixi, … *
- Data model distinguishes flow senders & flow receivers
- Common 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





Flows

Open database of flow senders & flow receivers

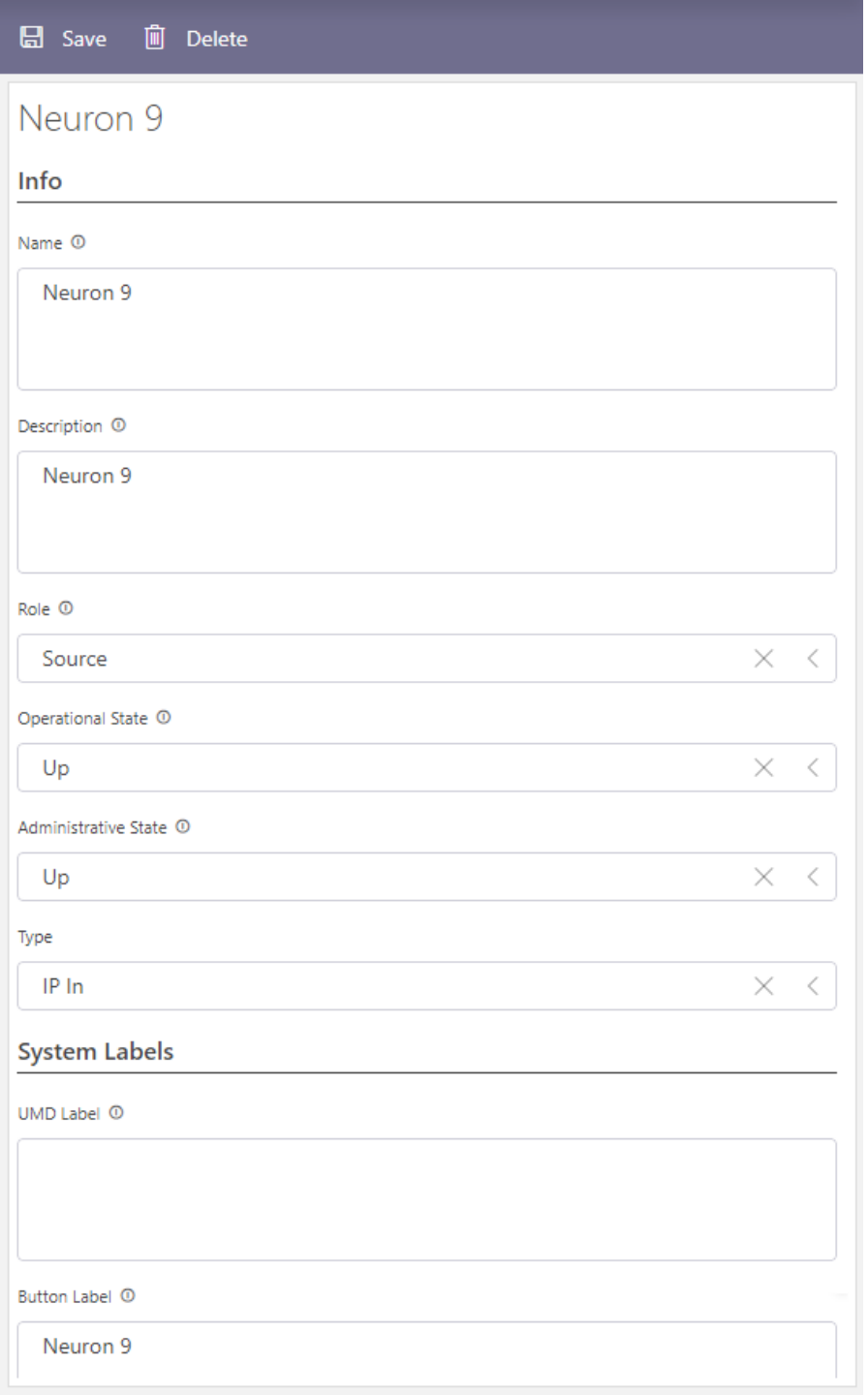


New Import Export

Flows

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, …



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

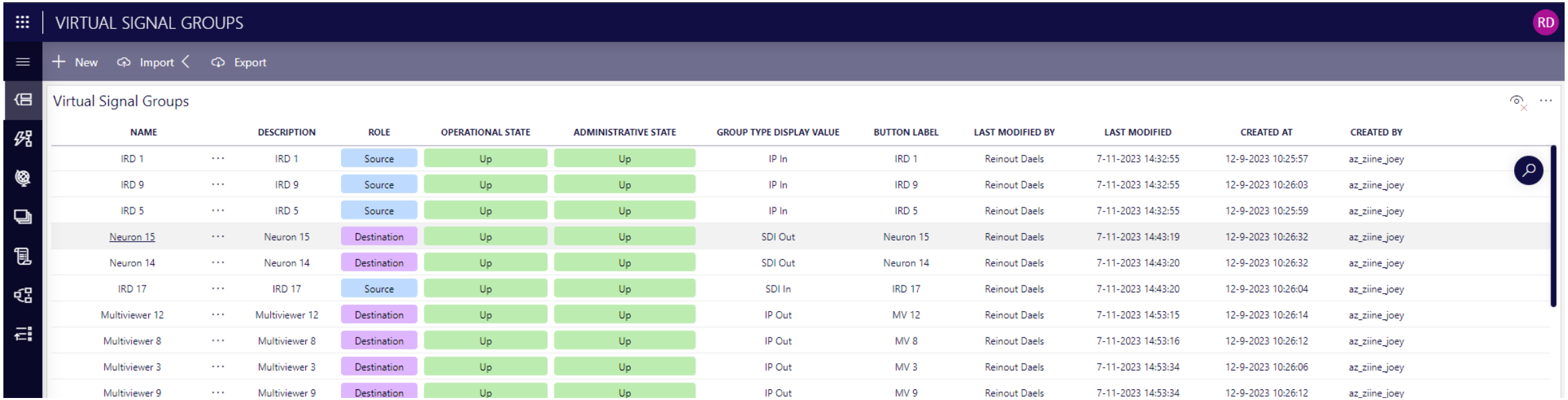
vsGroups can be CRUD **dynamically by event schedules**

- 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
Neuron 15	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

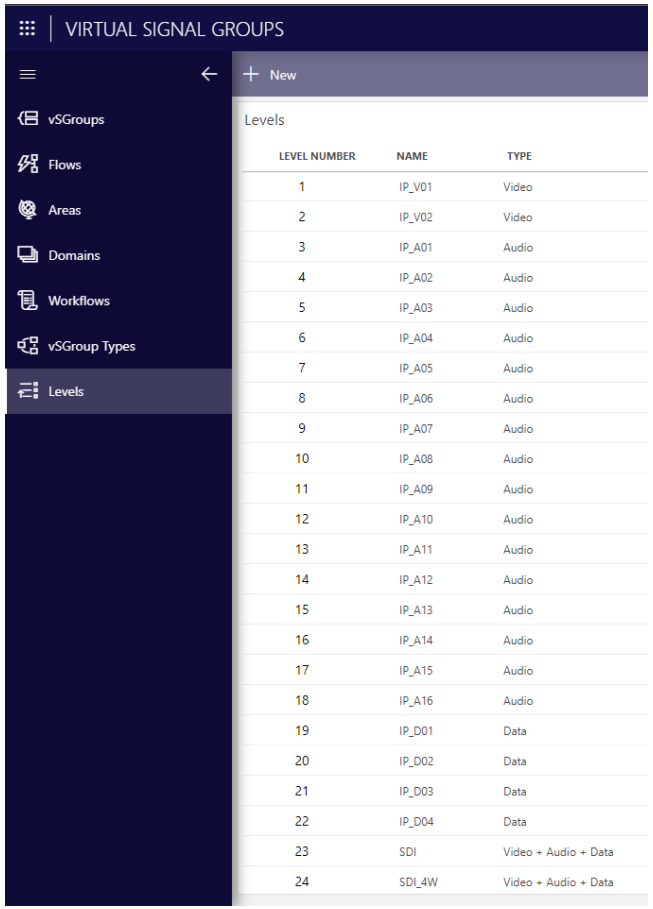
Virtual Signal Groups

Open database of sources & destinations

Edit

Levels

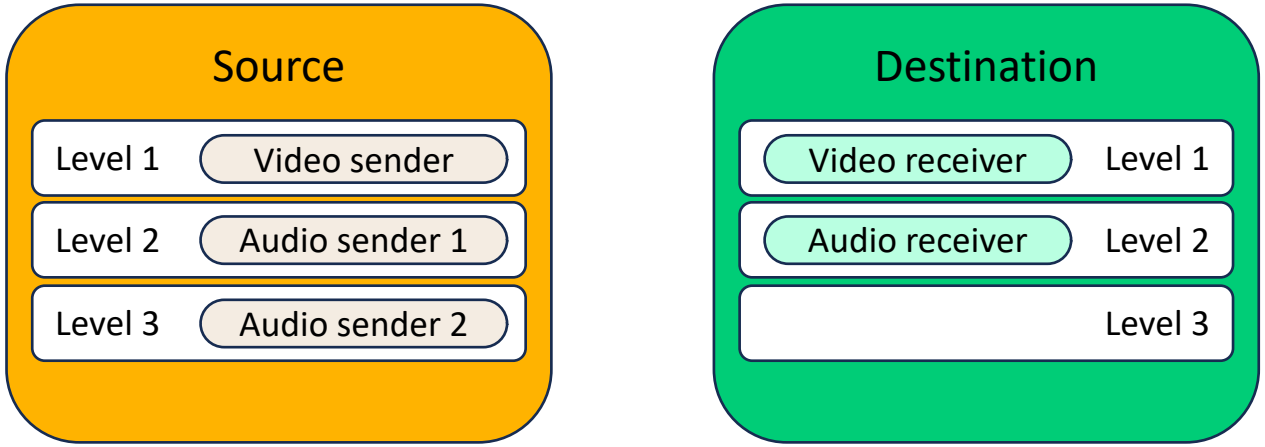
LEVEL NUMBER	NAME	BLUE FLOW	RED FLOW
1	Video	Neuron primary video stream	Neuron secondary video stream
2	Audio 1	Neuron audio stream 1 primary	Neuron audio stream 1 secondary
3	Audio 2	Neuron audio stream 2 primary	Neuron audio stream 2 secondary
4	Audio 3	Neuron audio stream 3 primary	Neuron audio stream 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		



- 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

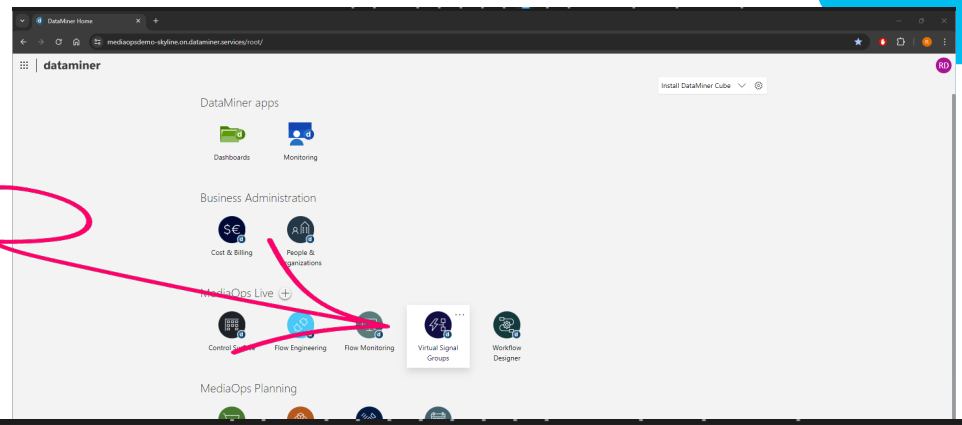
Create your own (IP) source & connect it

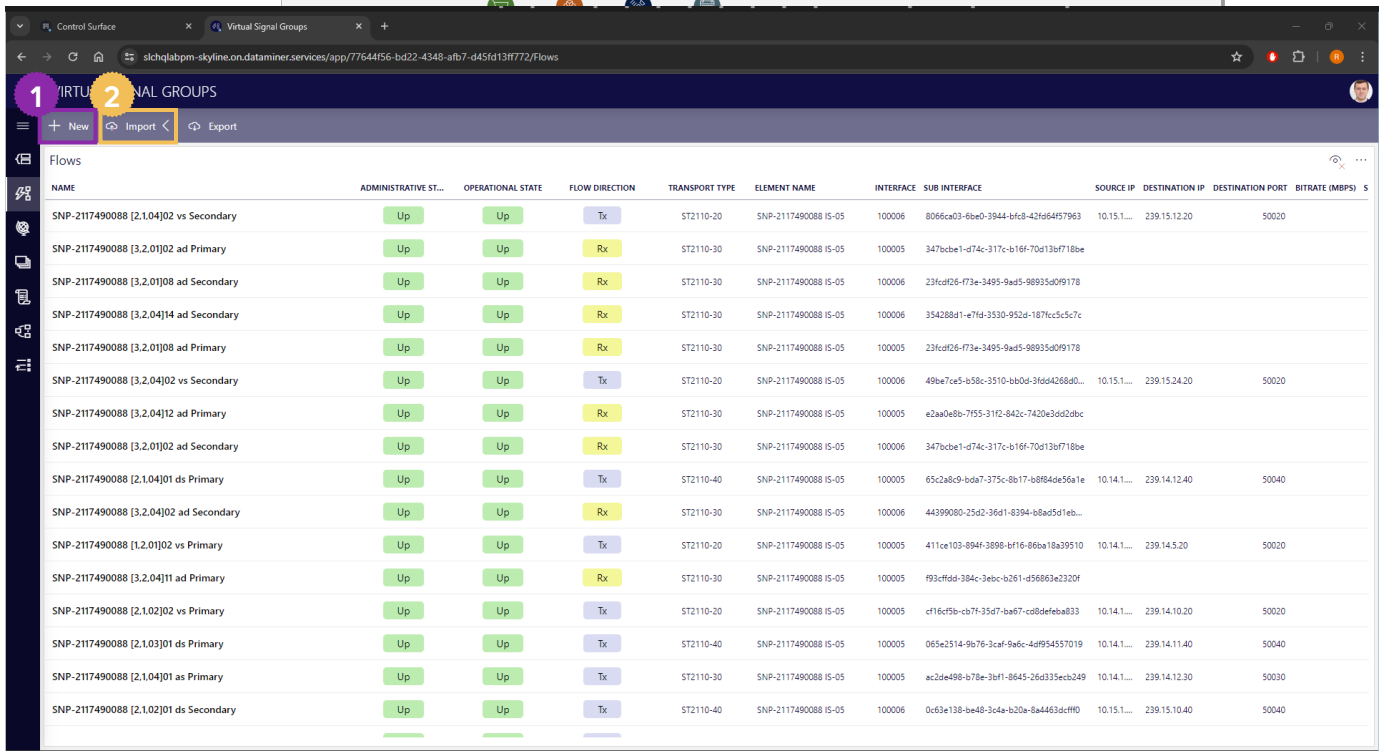
exercise

Flow senders & receivers

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

1. Manually
2. Automatically



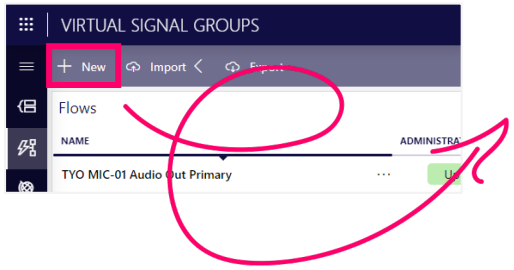


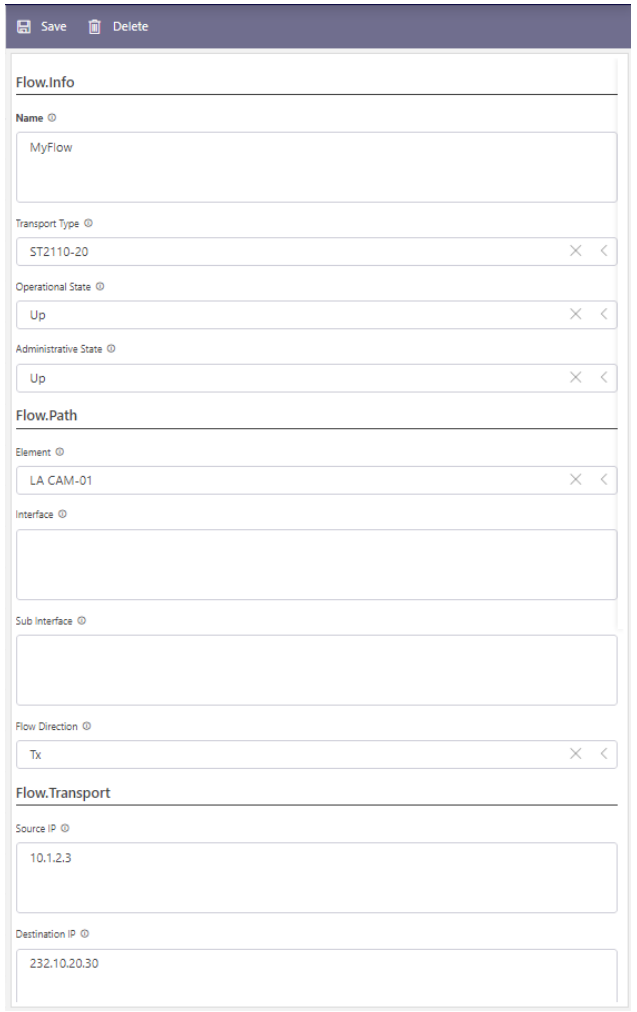
Create your own (IP) source & connect it

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’



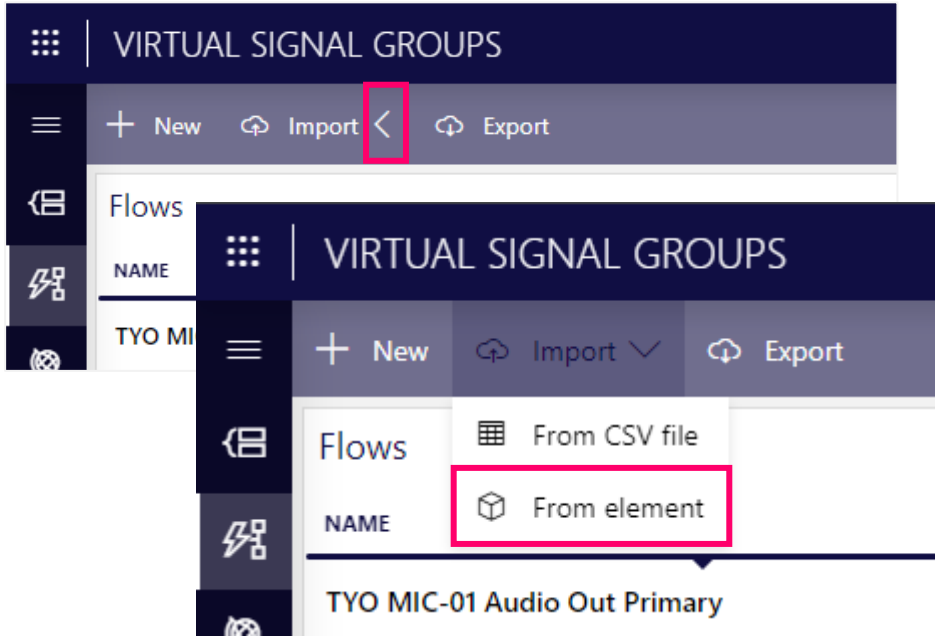


Create your own (IP) source & connect it

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’



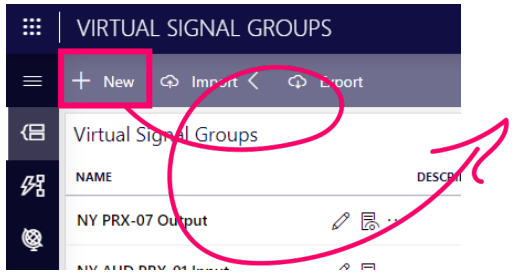
Currently only supported for ‘AMWA NMOS IS-05’ connector

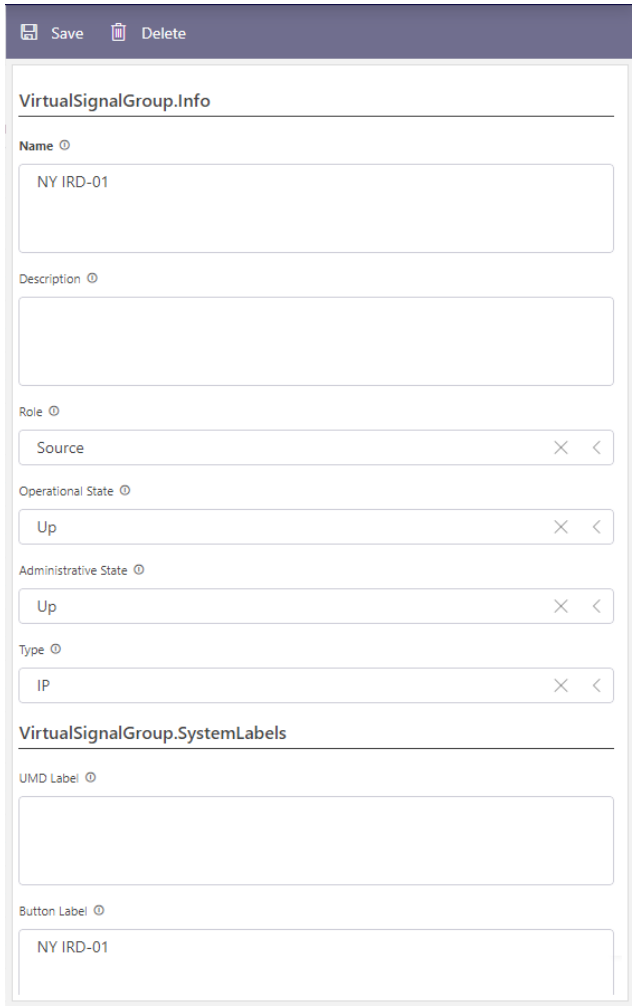
Create your own (IP) source & connect it

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’



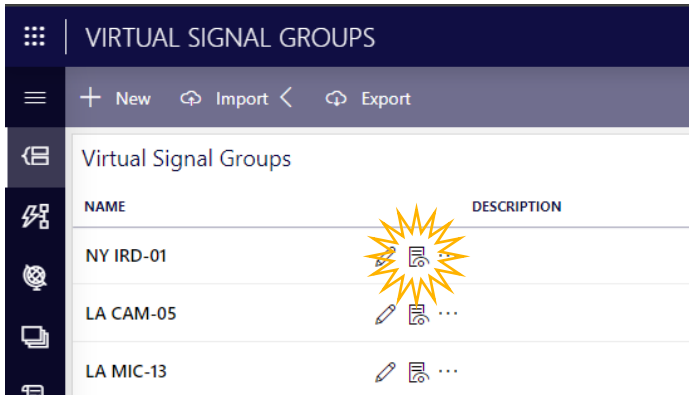


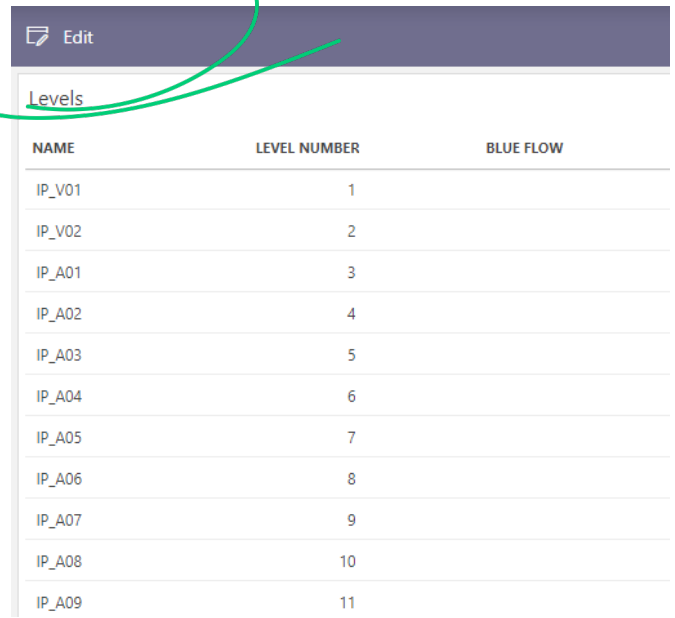
Create your own (IP) source & connect it

exercise

Add flow senders to your newly created source

- 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’



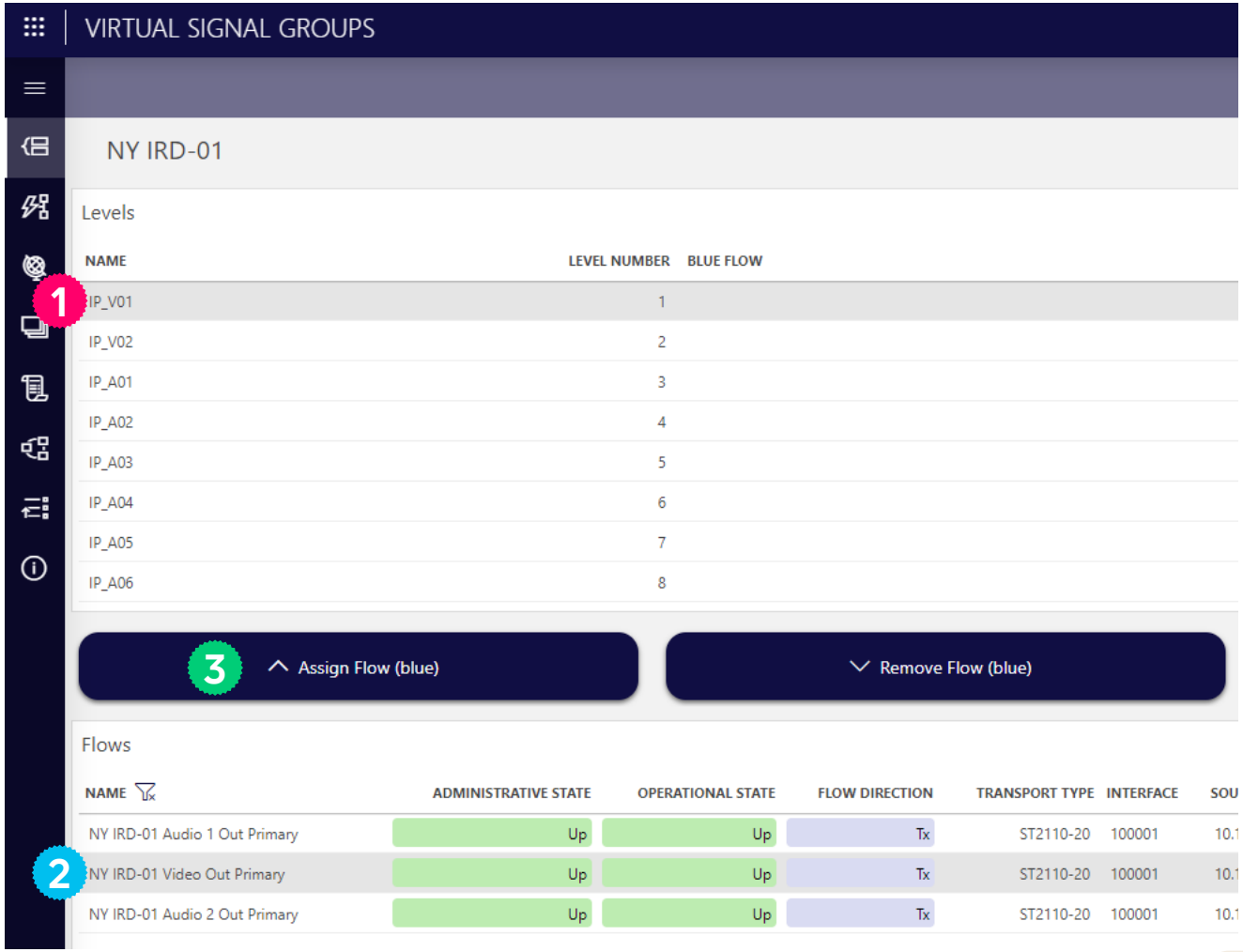


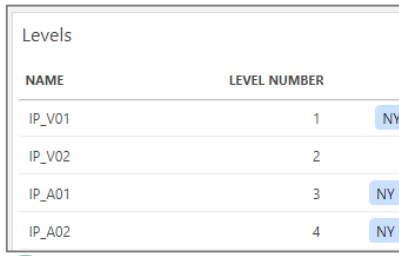
Create your own (IP) source & connect it

exercise

Add flow senders to your newly created source

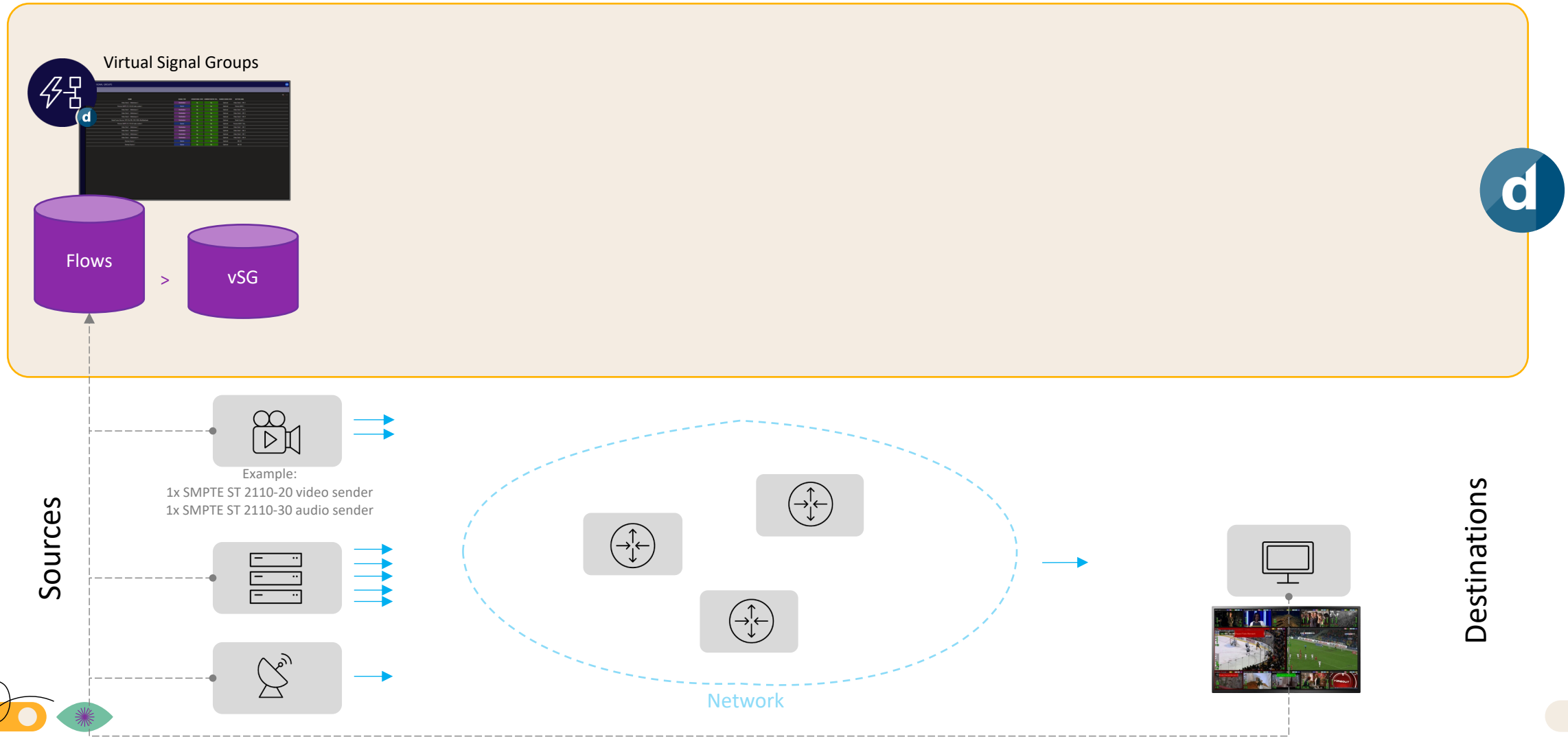
1. Select the level where you want to add the sender (Video 1/Audio 1/Audio 2) in the 'Levels' table
   - Find the sender you want to add in the 'Flows' table below and select it
2. Via filtering on the 'Name' column
   - By sorting on the 'Created at' column
   - By using the table search
3. Click 'Assign 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





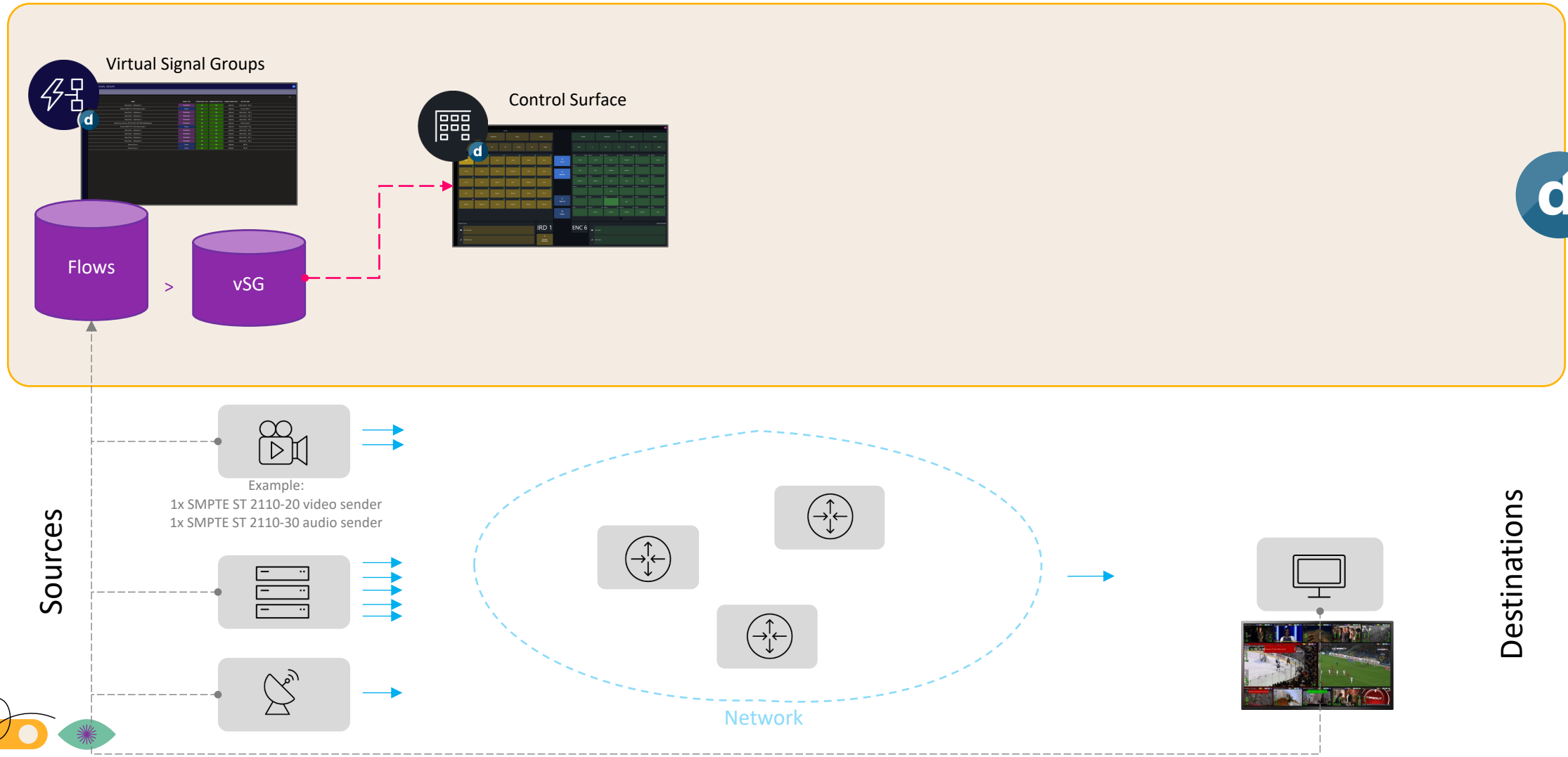
DataMiner MediaOps LIVE

High-level picture



DataMiner MediaOps LIVE

High-level picture



Create your own (IP) source & connect it

exercise

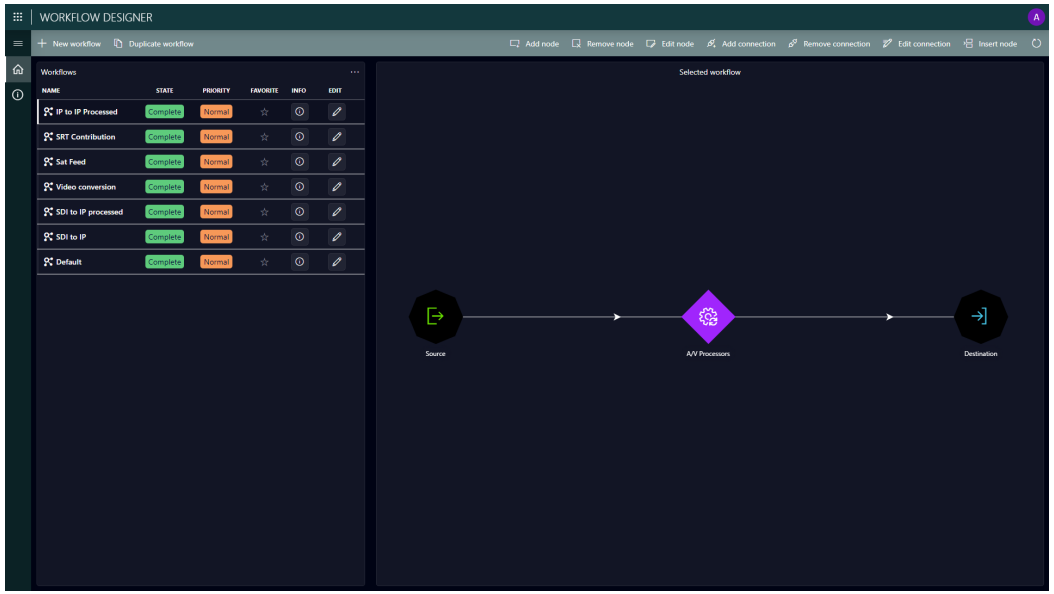
Connect your newly created source to a destination

- 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

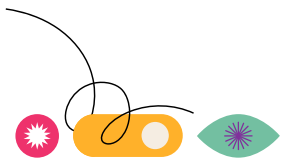


Create and run your own workflow

Build a custom control surface

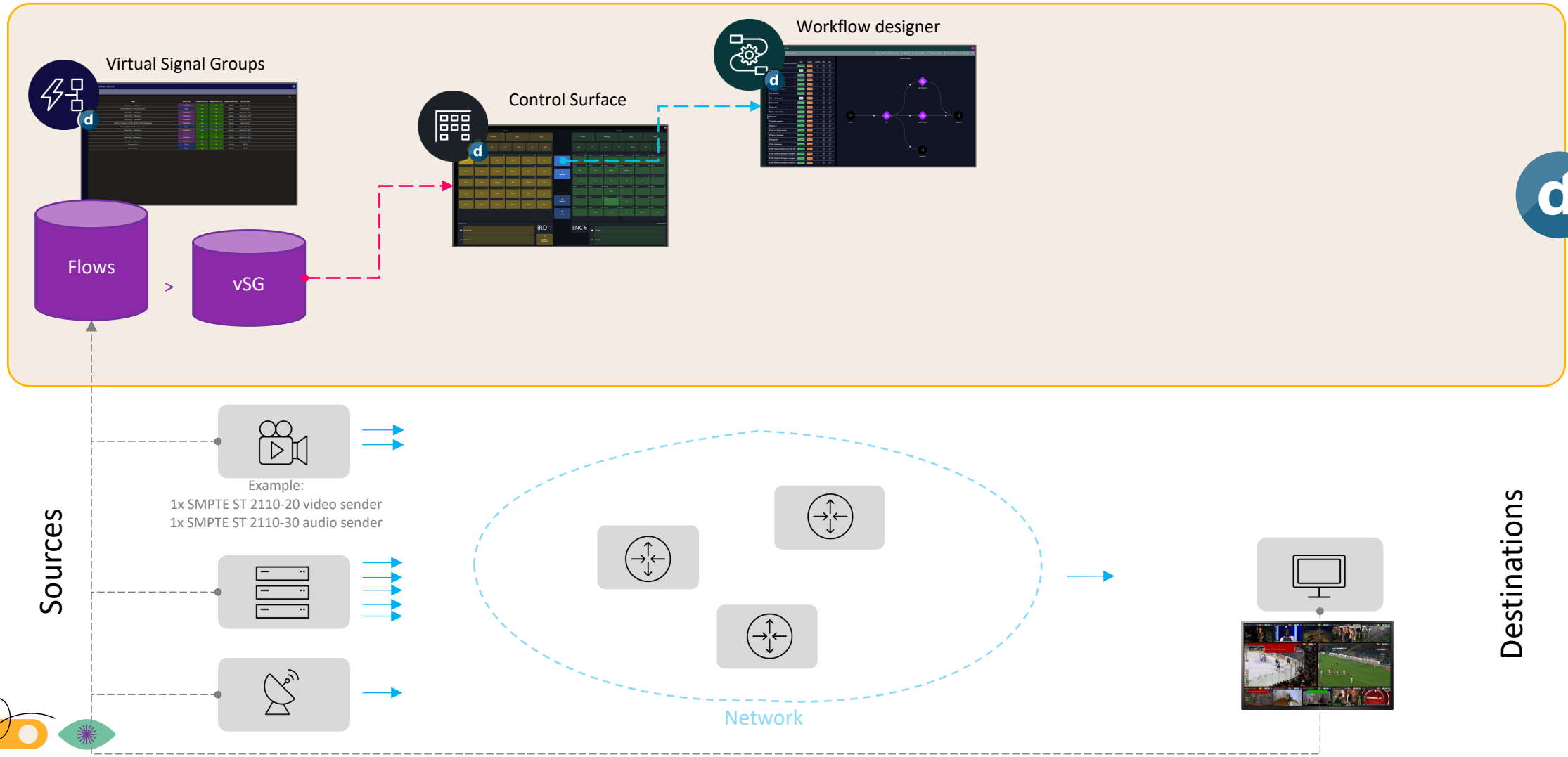
Workflow designer

Build and run your own workflow



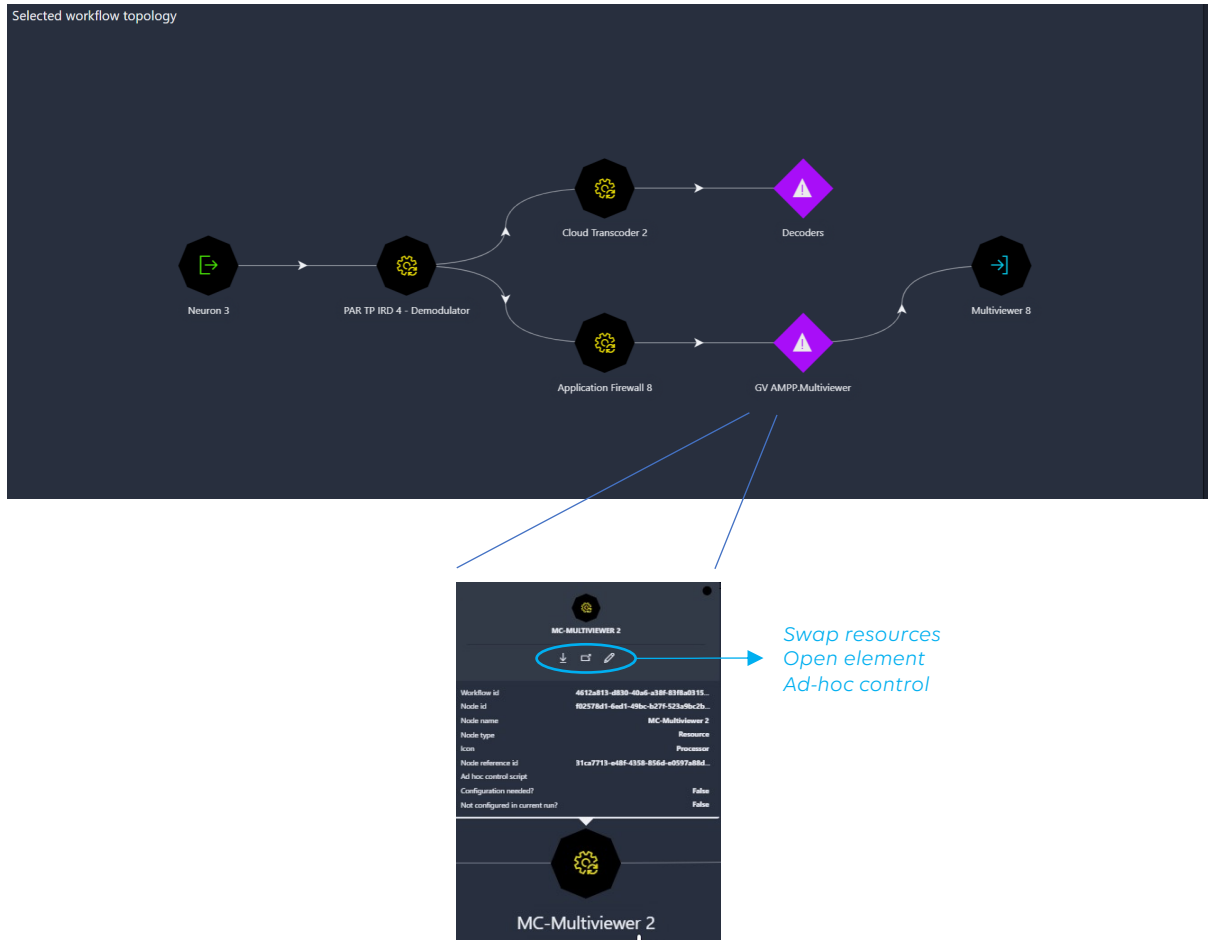
DataMiner MediaOps LIVE

High-level picture



Workflow Designer

Design your technical workflow with ease



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

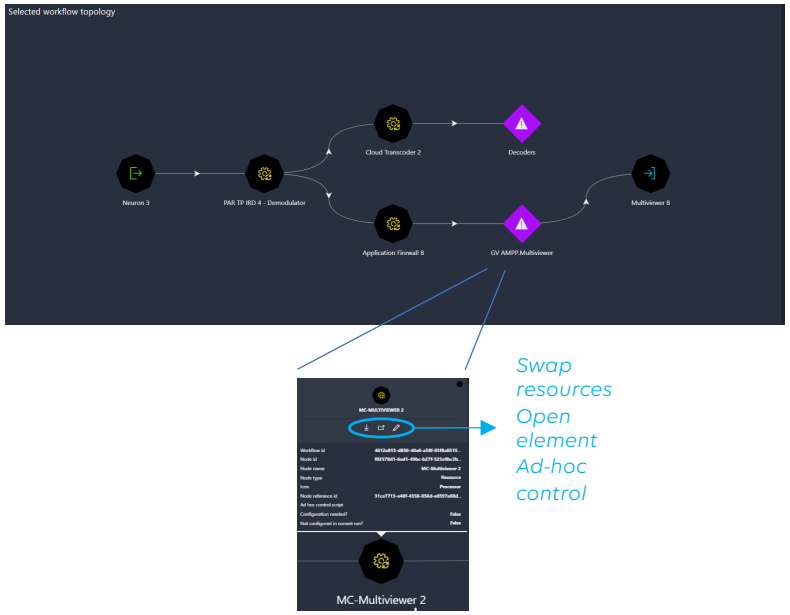
A workflow **describes** how **signals** (vSG) are processed from source to destination using a **sequence of nodes** (resources or resource pools)

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°

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

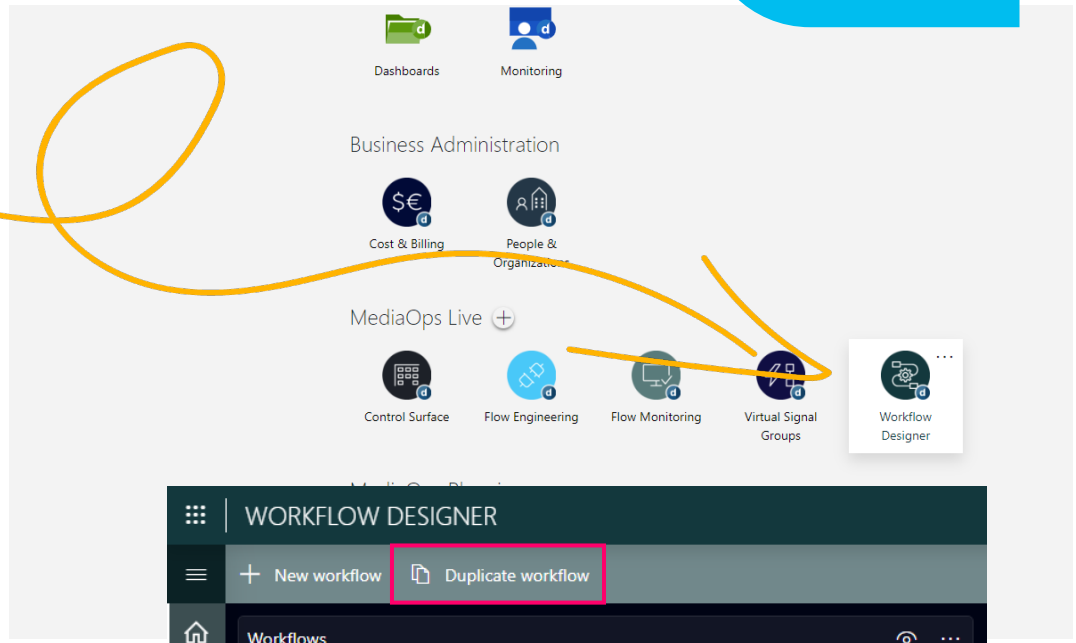
Optionally select the service **visualization** by selecting a Visio Service Template

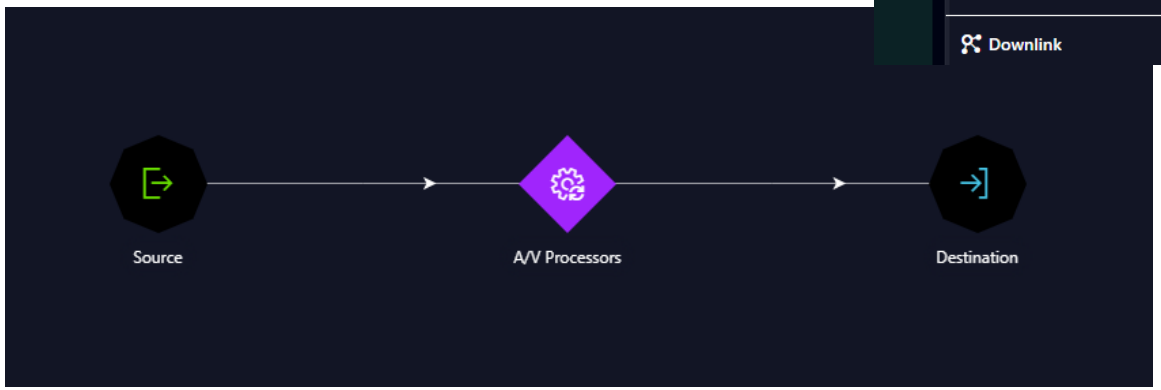
Build and run your own workflow

exercise

Create your workflow from an existing one

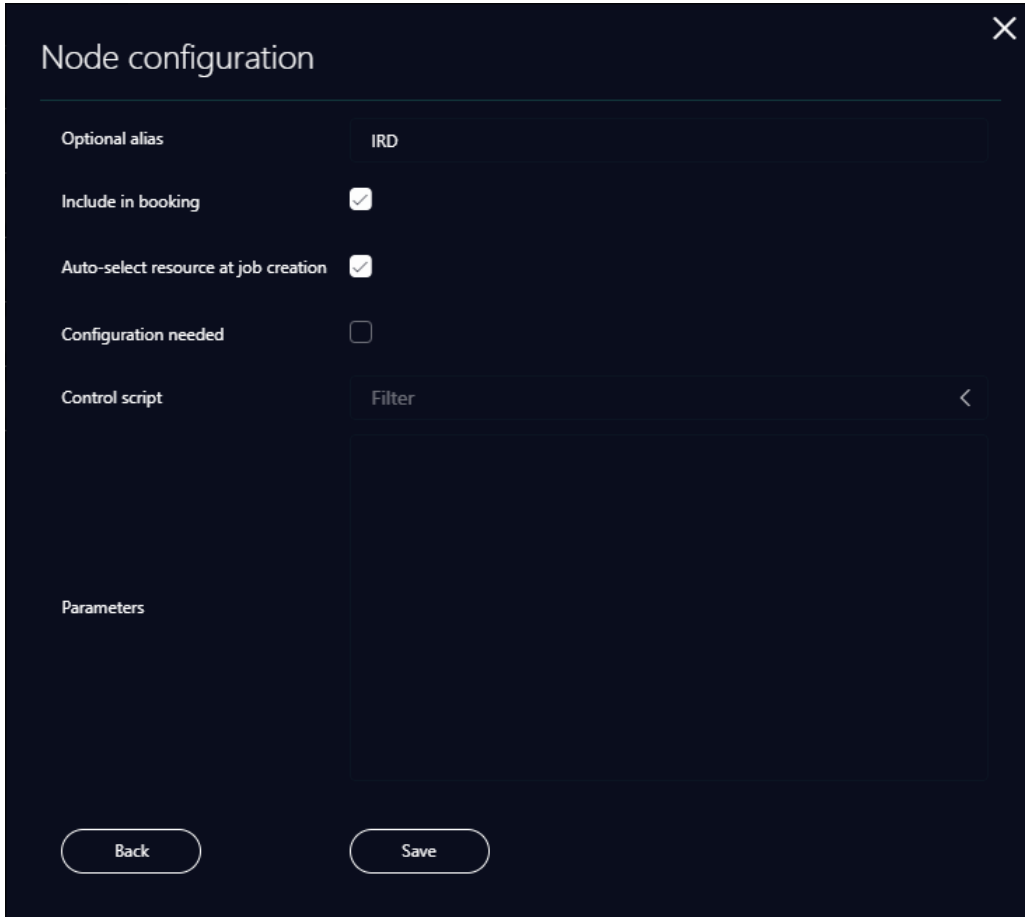
- From the home page of your system, open the Workflow Designer app
- Duplicate the default workflow
- Click the connection between the source and destination and click 'insert node' on the app's header bar
- Select 'resource pool' and then 'A/V Processors'





Build and run your own workflow

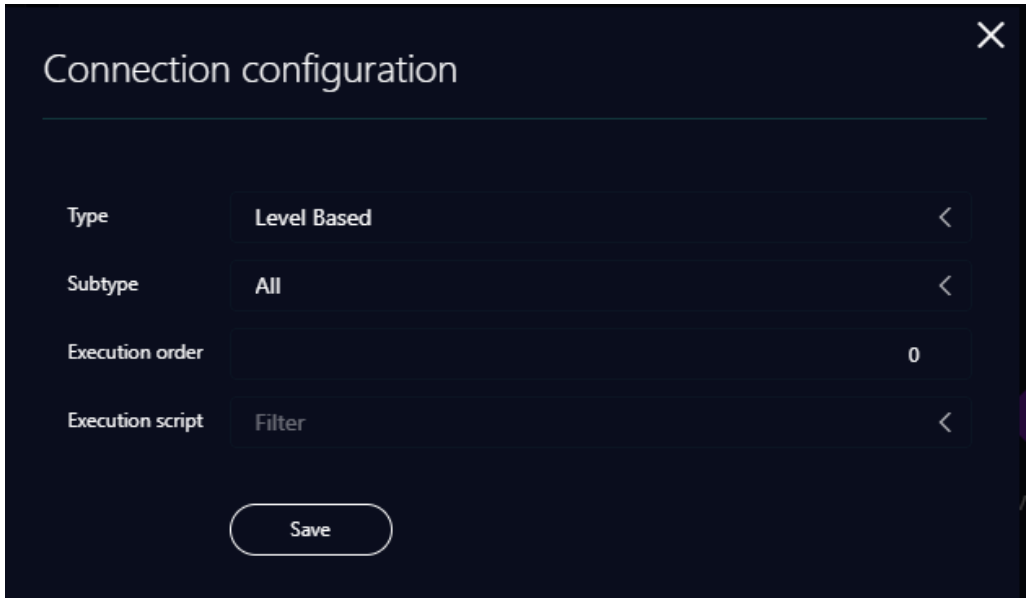
Options on node in a workflow



BONUS

Build and run your own workflow

Options on connection in a workflow



Workflow designer

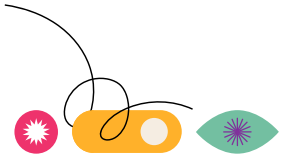
Run your workflow from the control surface

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

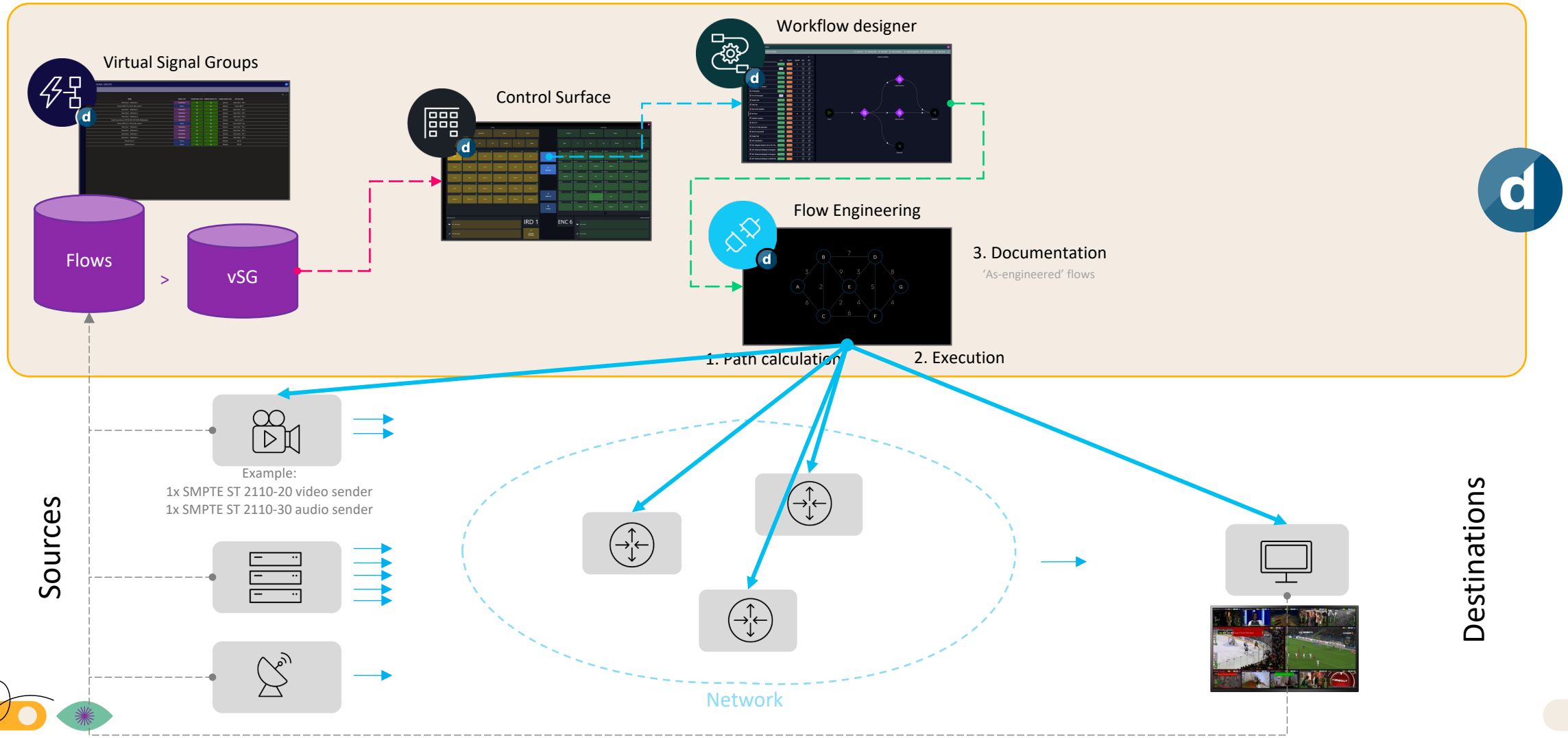
- Open the Control Surface app
- Connect the source you created earlier it to a MV PIP in the MCR
- See that a resource gets automatically inserted in the middle of the control surface
- Verify the resulting flow paths in the flow monitoring app

- 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

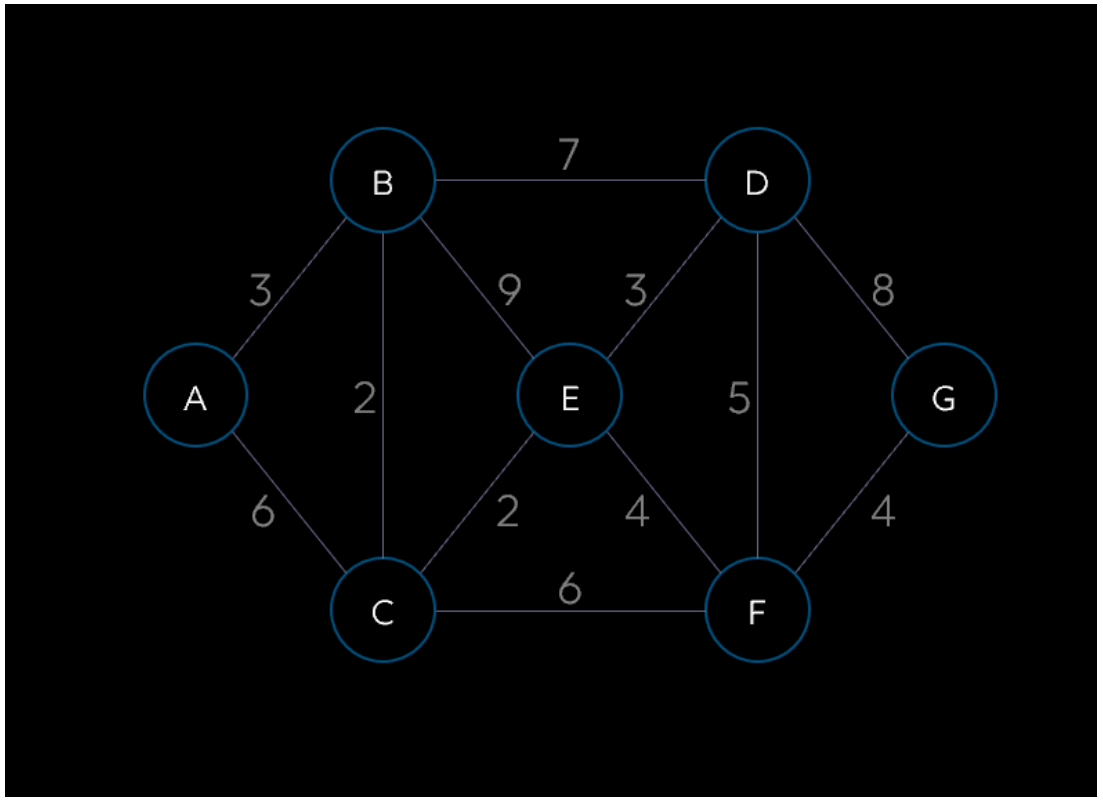
Document as-engineered flows

Unified across the domains (edges + network fabric)

3. Trigger flow execution

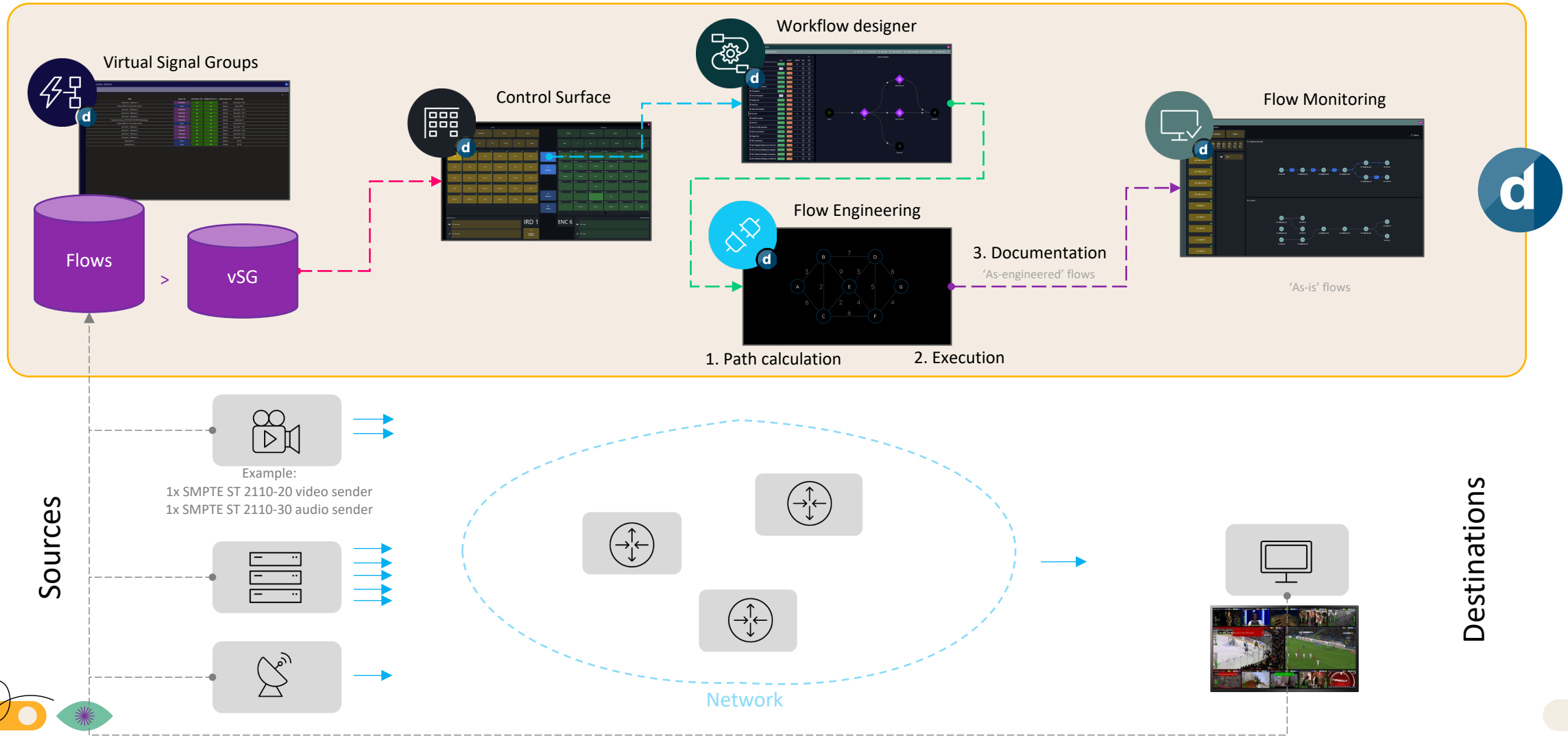
Controls elements to set up a connection with a **standardized message** to the connector

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



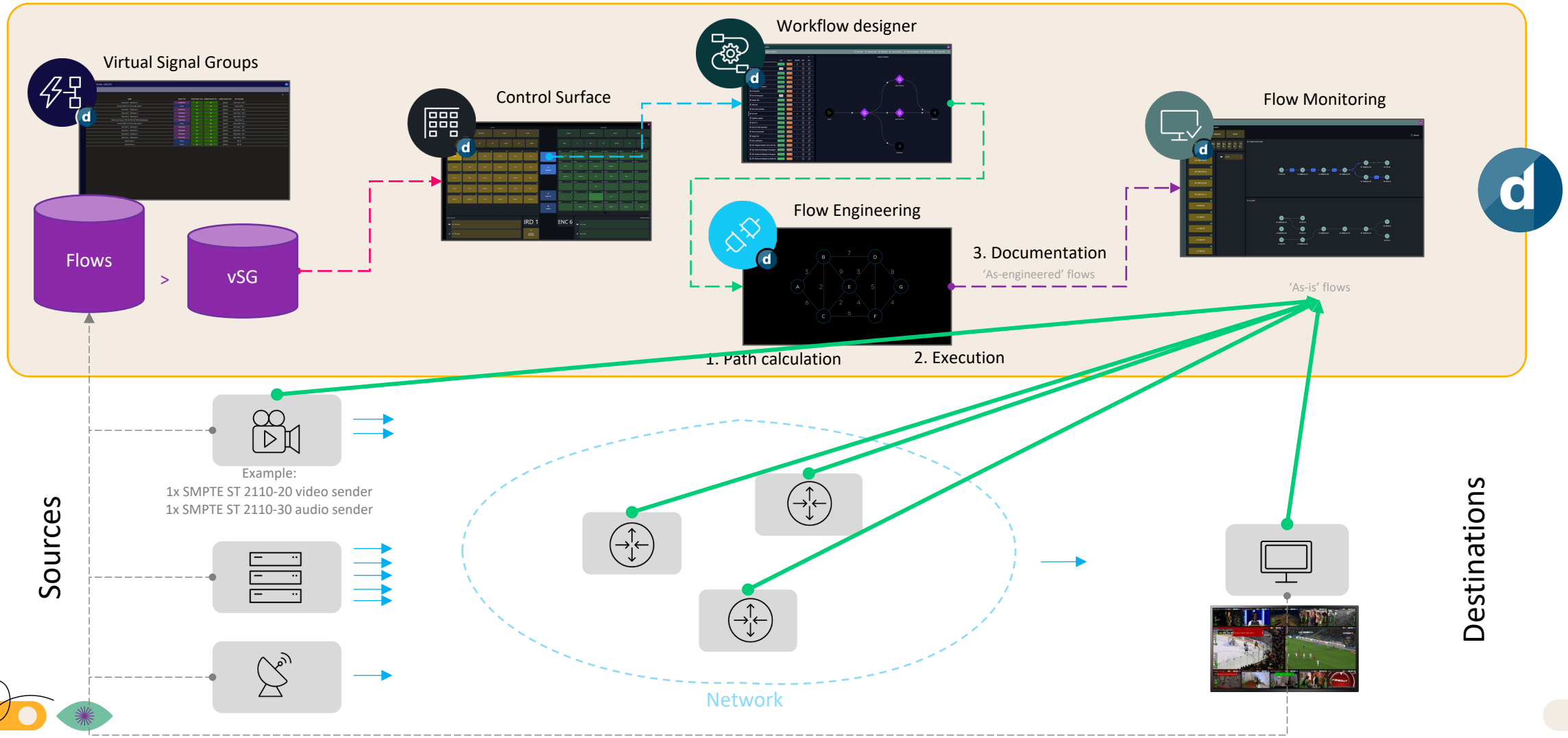
DataMiner MediaOps LIVE

High-level picture



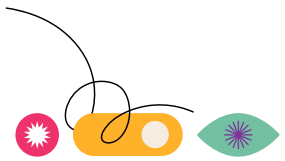
DataMiner MediaOps LIVE

High-level picture



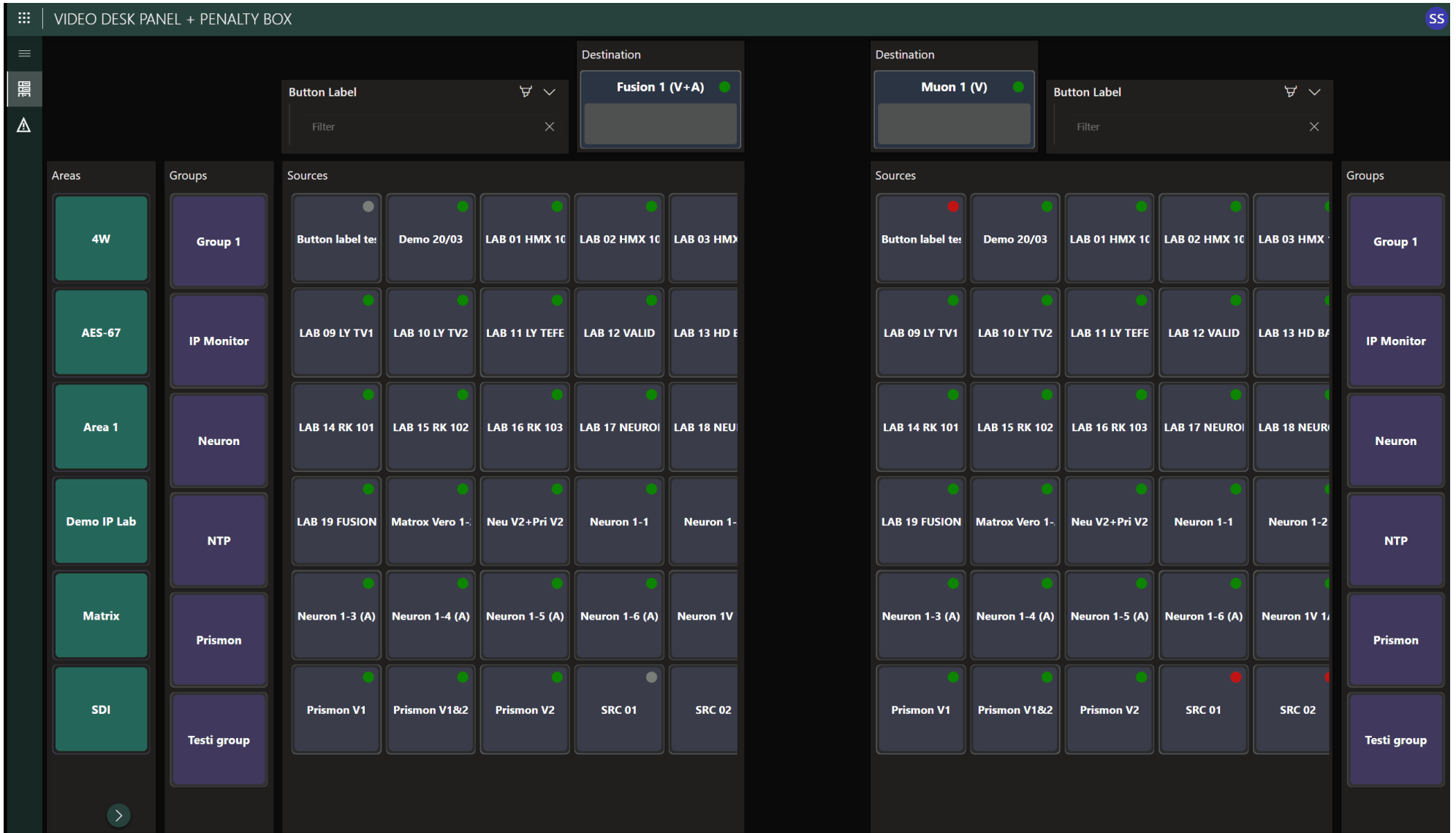
Control Surface

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 GQI

Custom **look & feel**

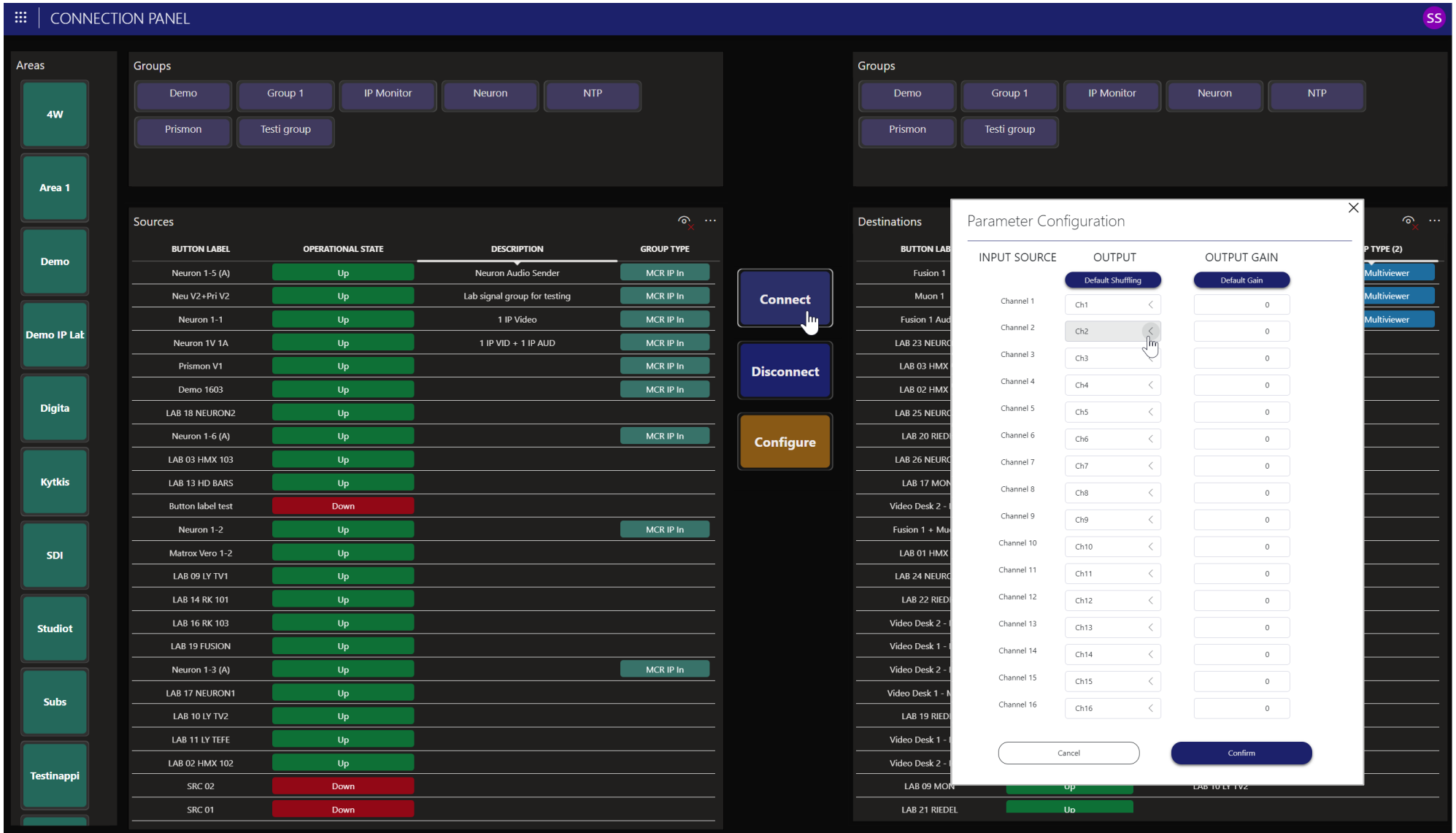
Easy navigation

Pagination, filters, search, …

XY, single dest. …

Control Surfaces

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



Large scale operations

Embedded **ad-hoc** operations

IA for **resource selection** and **scheduling**

Customized **workflows**

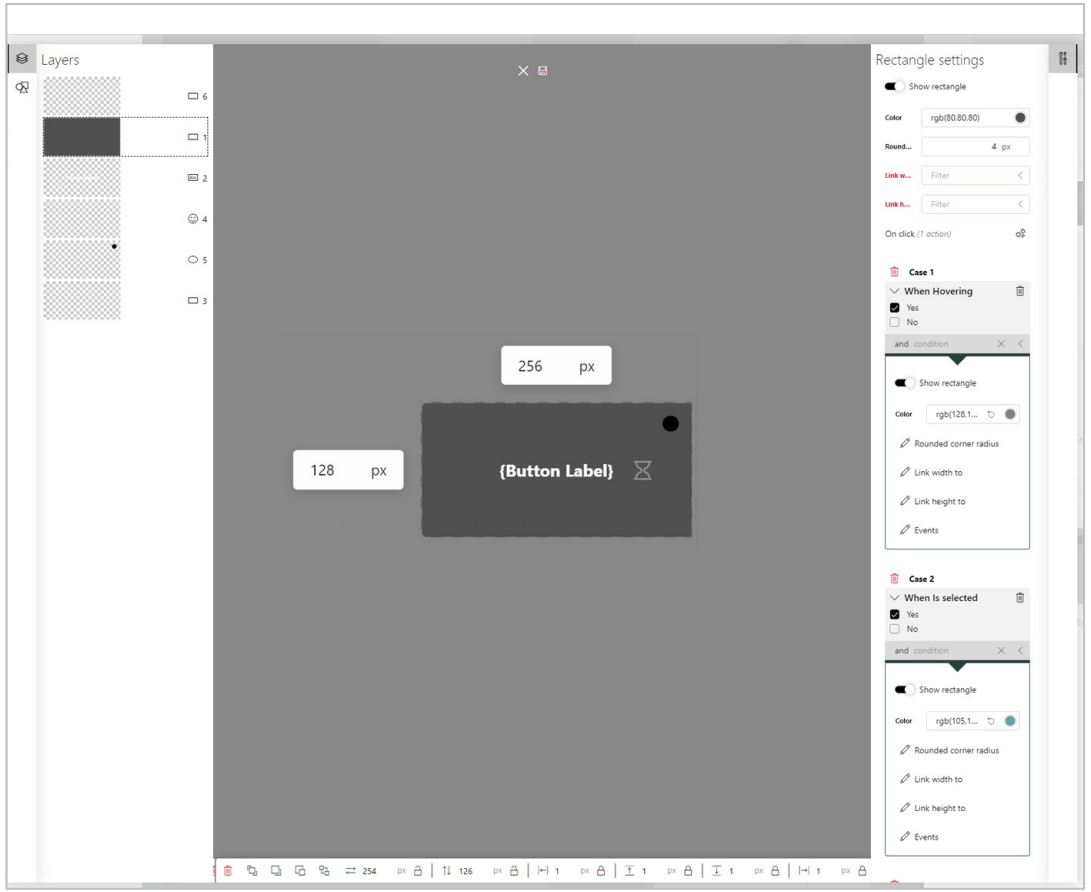
UI and API

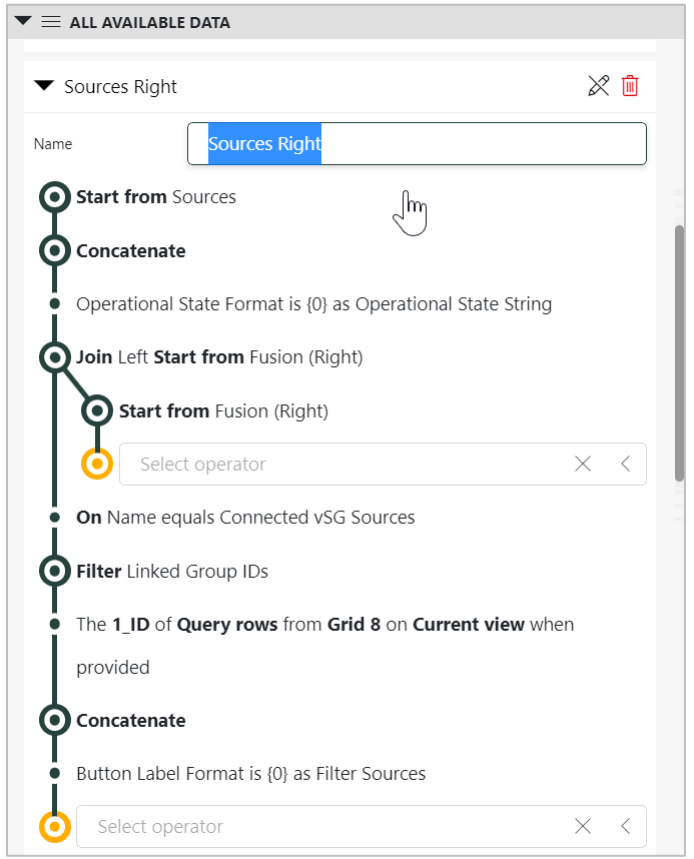
Dataminer.services **sharing**

Remote operation

Control Surfaces

Devops environment is the baseline for continuous evolution





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

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

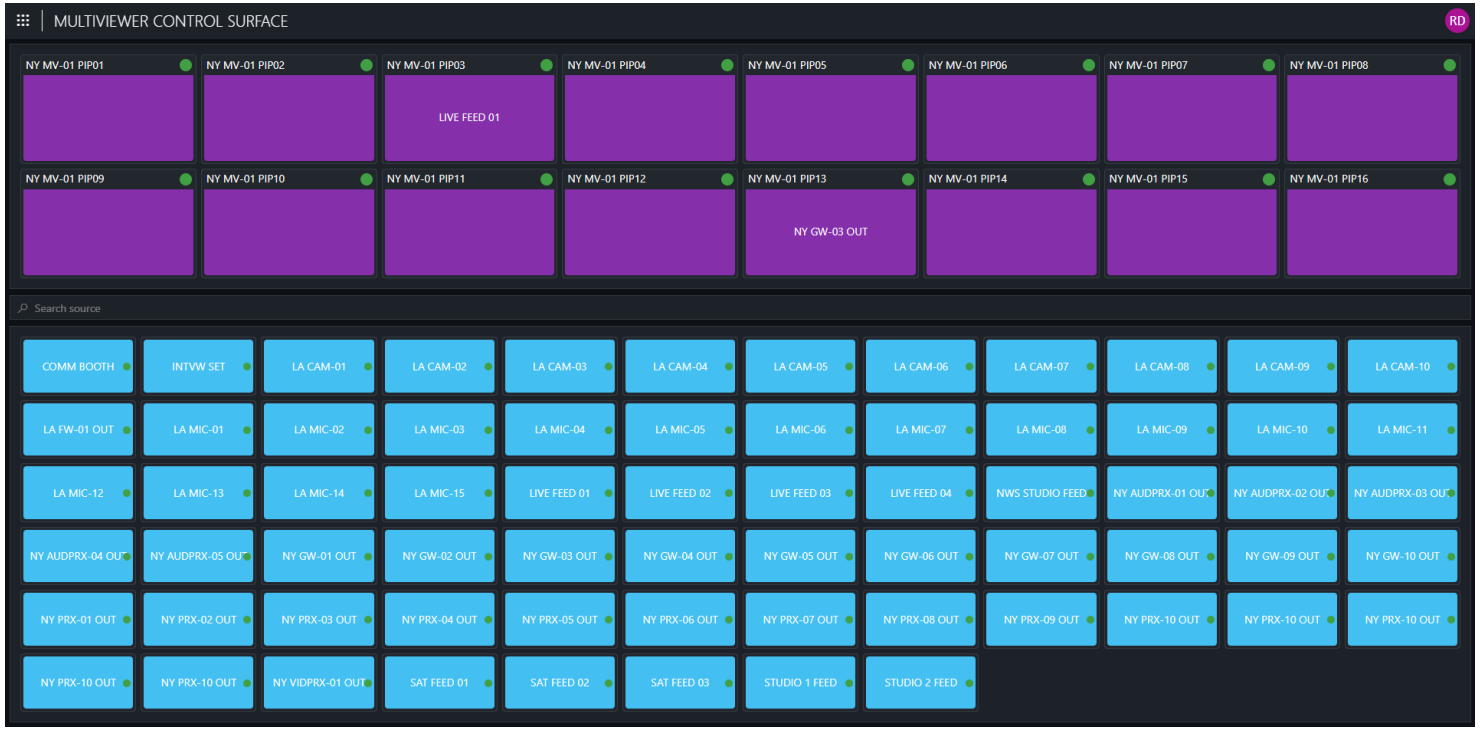
Visualization of buttons can be **customized with visual editor**

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:

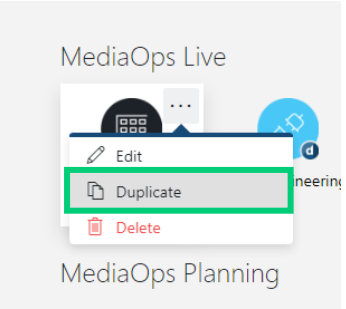


Control Surface

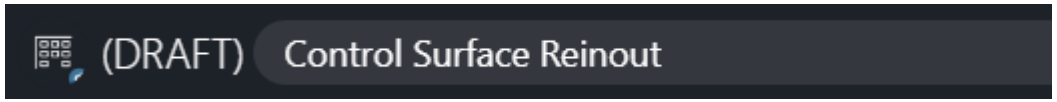
exercise

Tweak the lay-out of the control surface

- Start by making a duplicate of the standard app



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

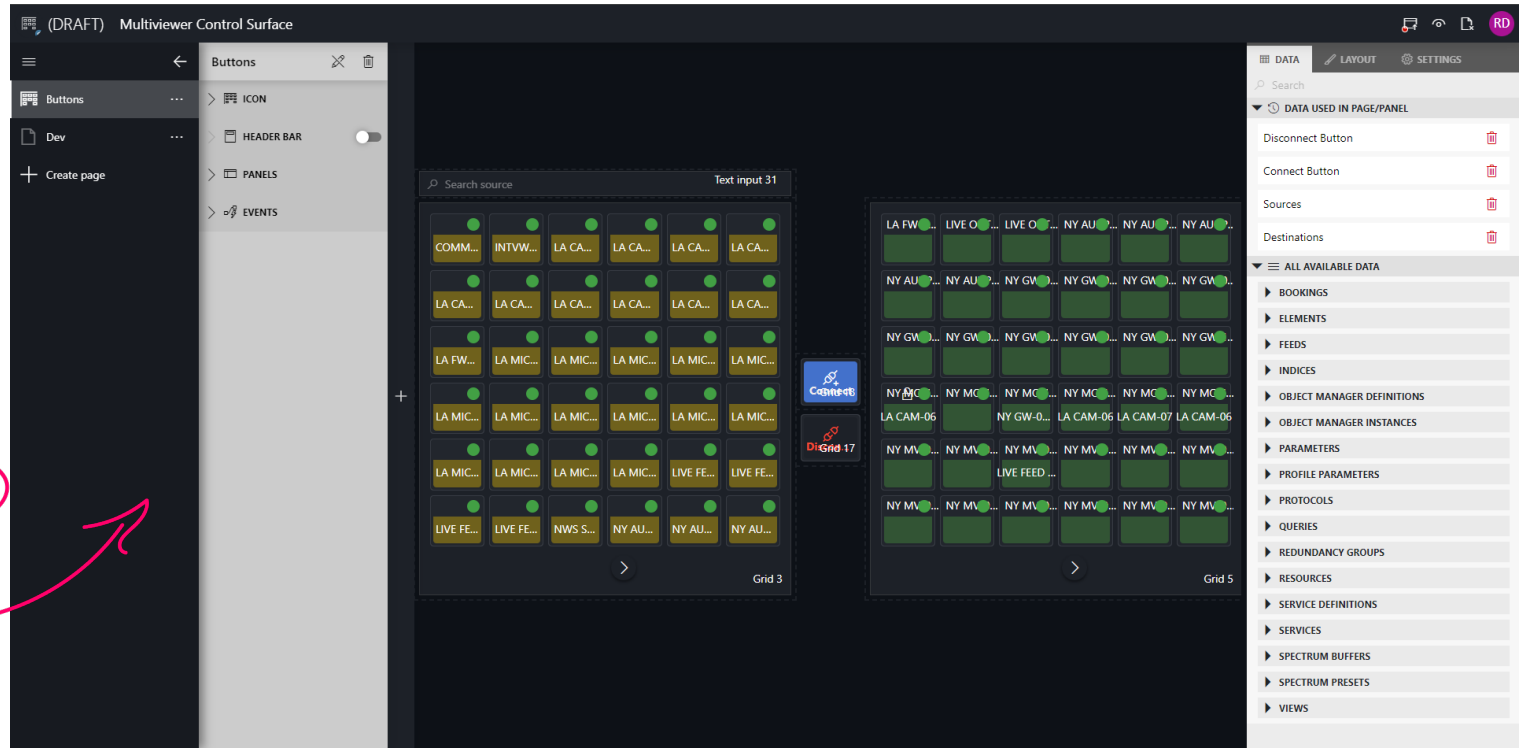


Control Surface

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

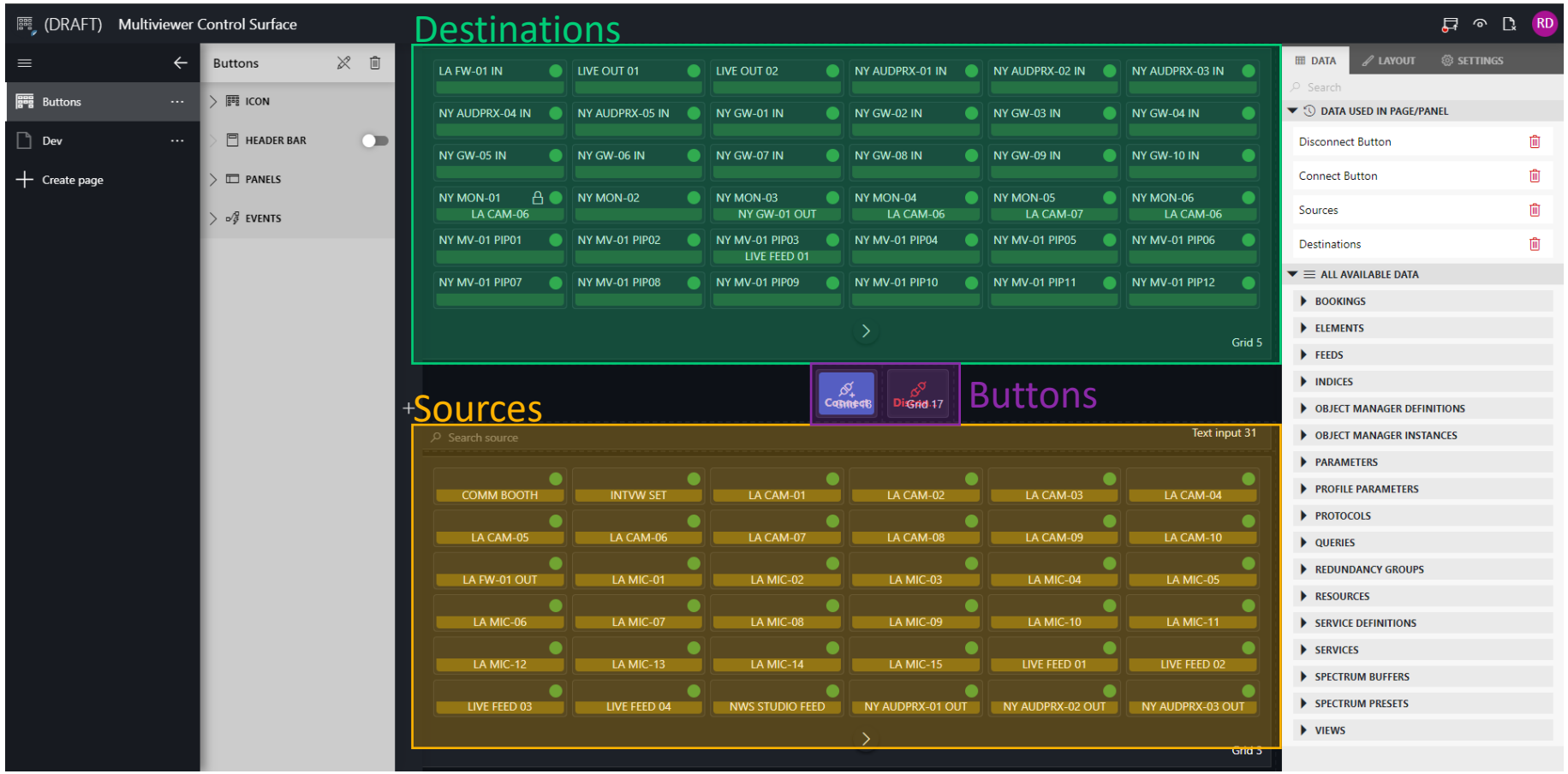


Control Surface

Tweak the lay-out of the control surface

exercise

- Rearrange the remaining components as follows:



Control Surface

exercise

Tweak the lay-out of the control surface

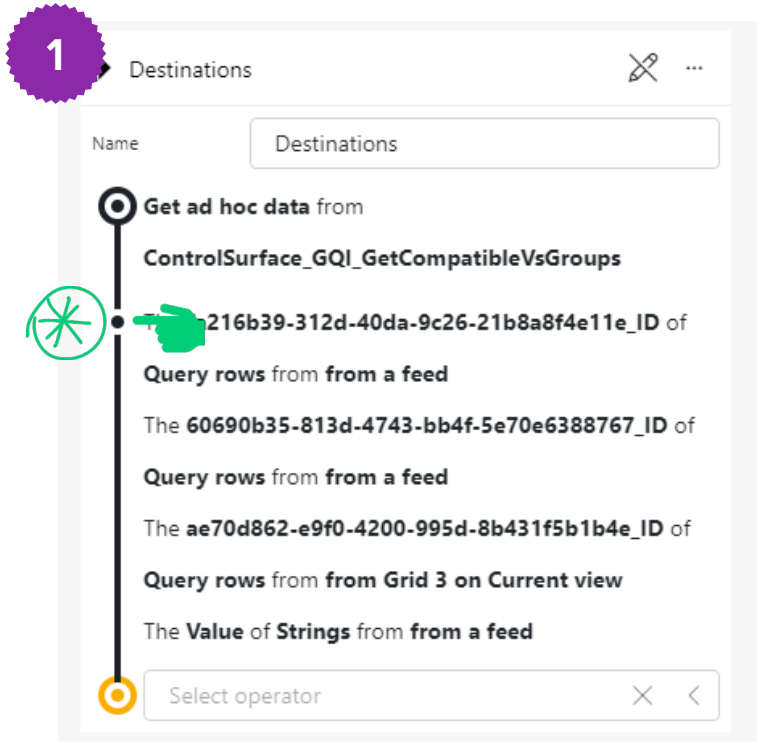
- Filter the destination buttons so that only multiviewer destinations are shown
- Under ‘Queries’, find ‘Destinations’ and click the pencil icon to edit the query

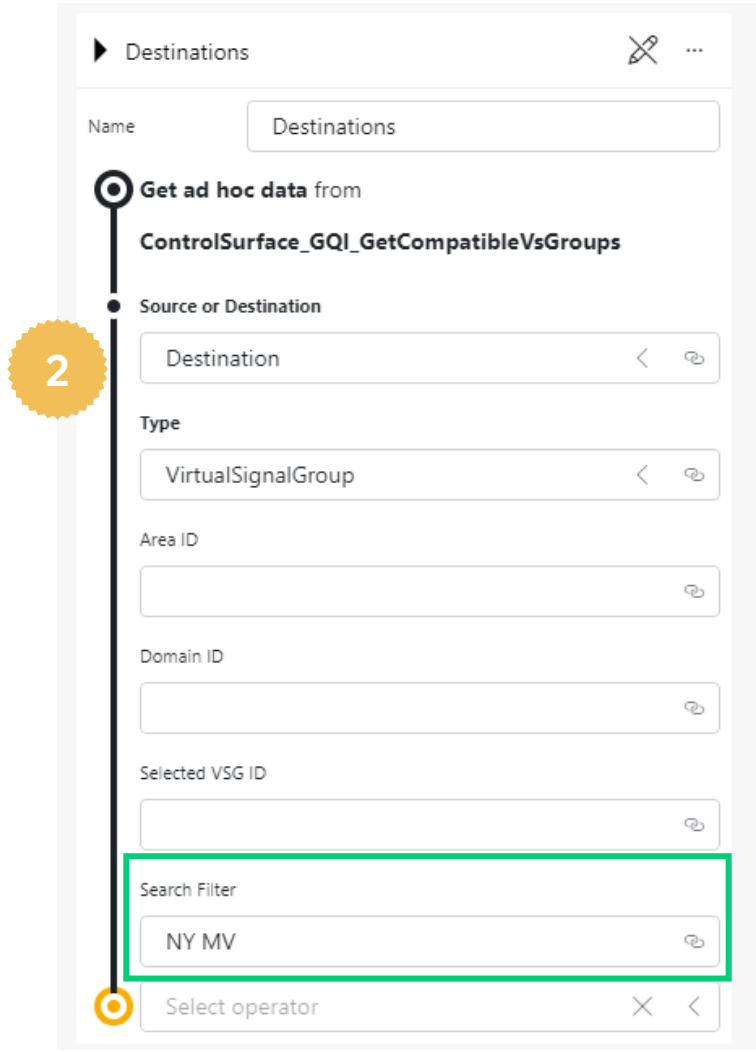
Control Surface

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)





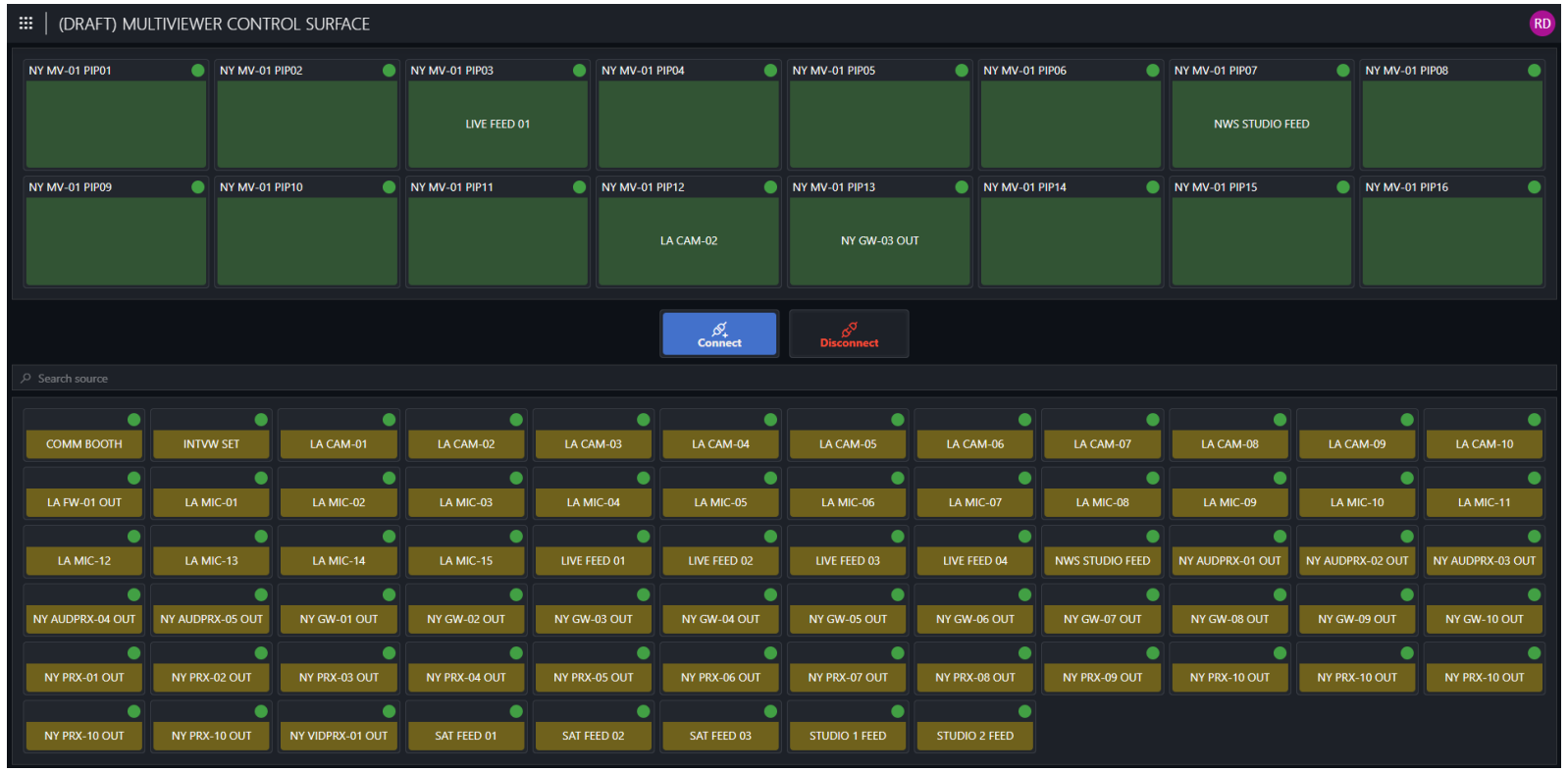
Control Surface

Tweak the lay-out of the control surface

BONUS

exercise

- 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

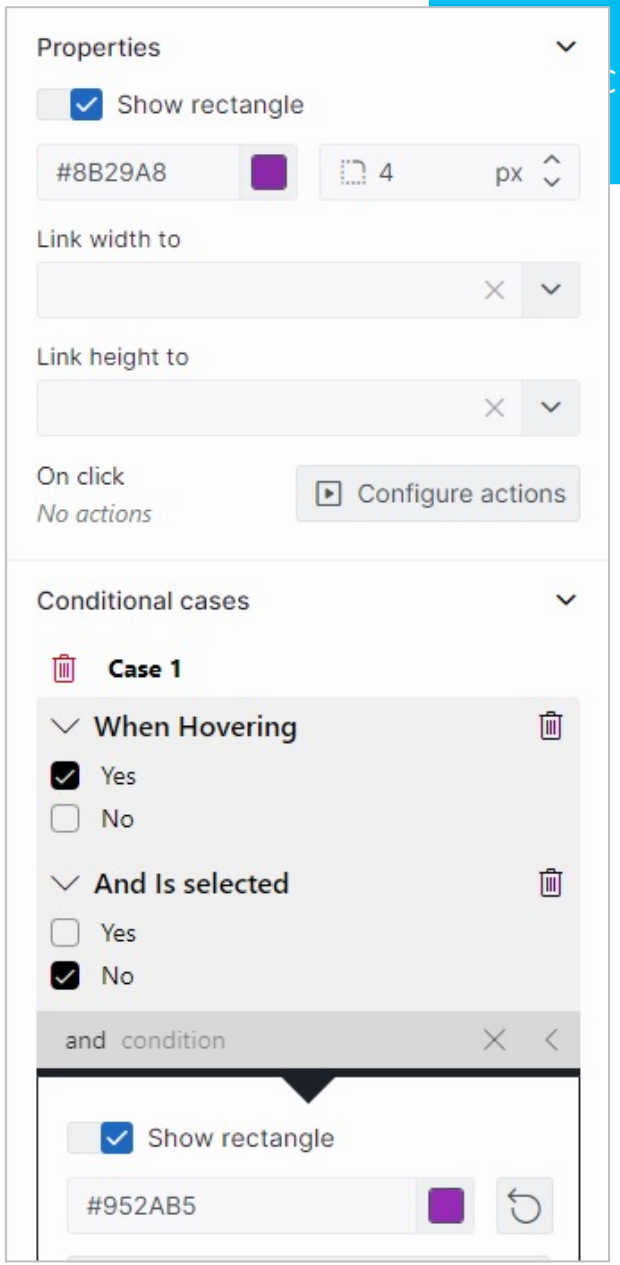


Control Surface

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:

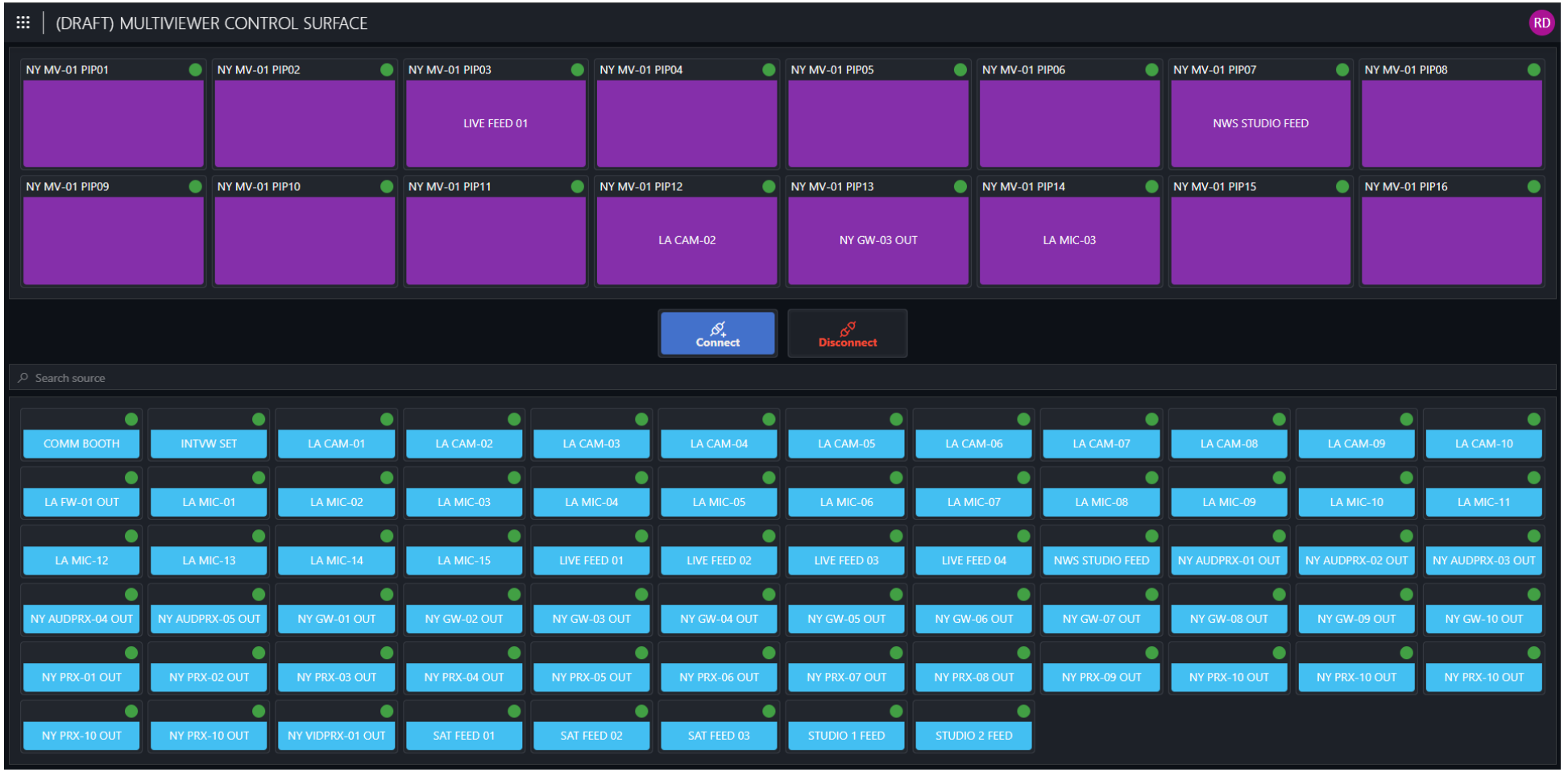
Sources		Destinations	
Default:	(#00BFEF)	Default:	(#8B29A8)
Hovering:	(#26C9F1)	Hovering:	(#952AB5)
Selected:	(#43D8FF)	Selected:	(#B63ED9)



Control Surface

Tweak the lay-out of the control surface

exercise

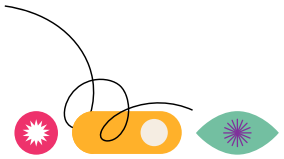


Control Surface

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

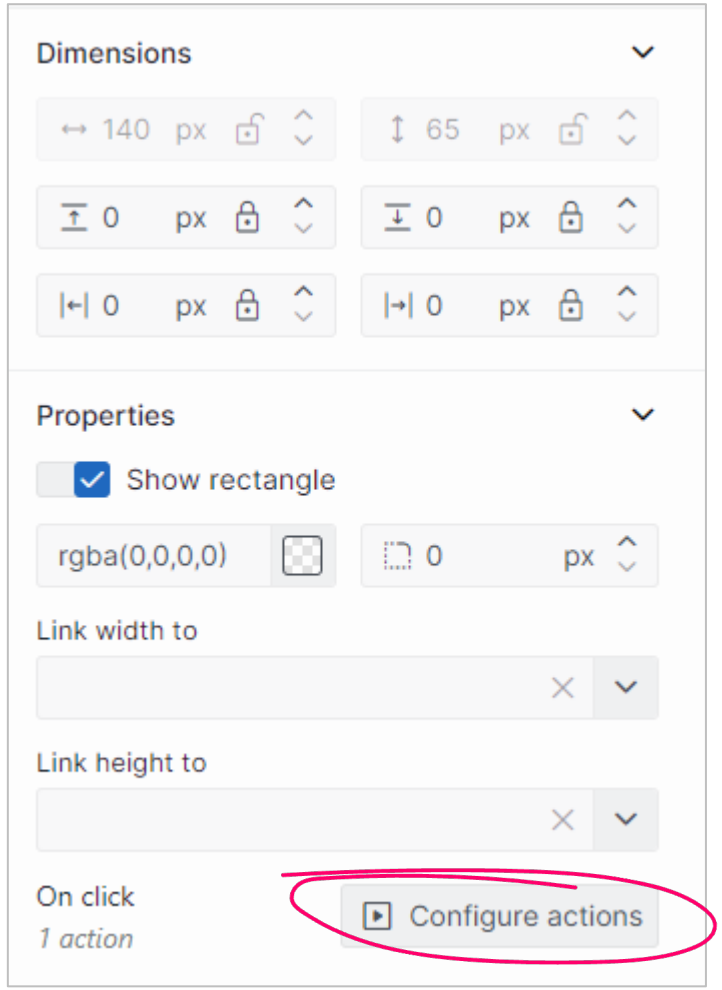
Tweak the behavior of the control surface

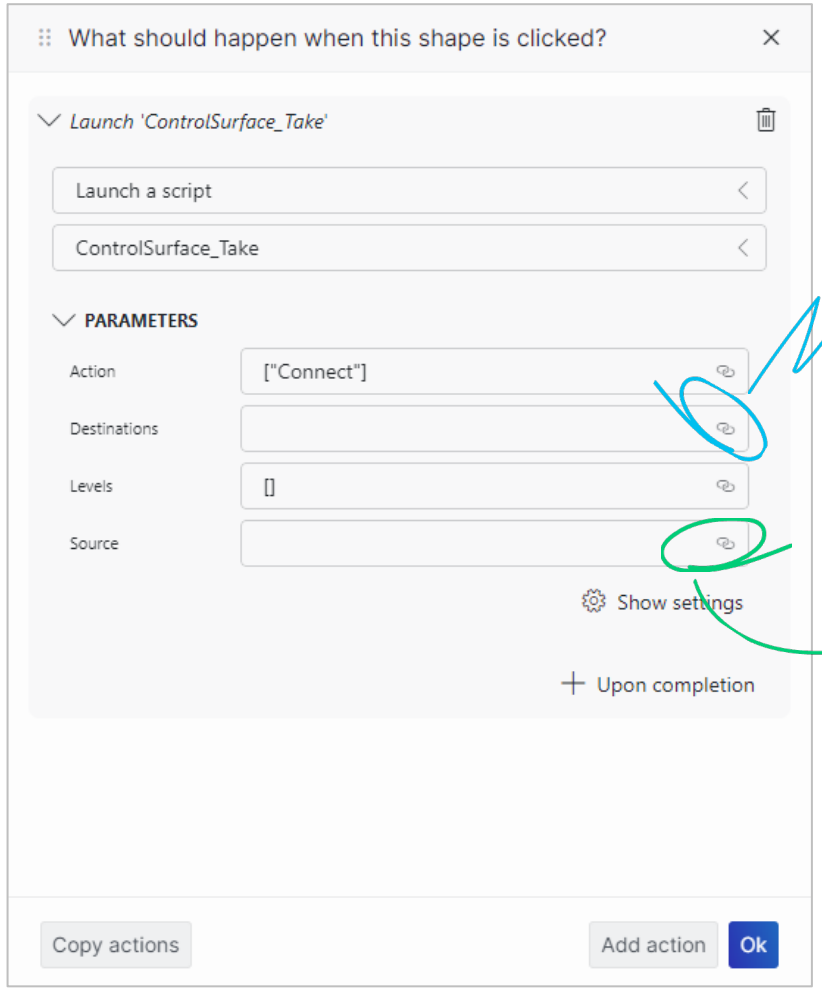
exercise

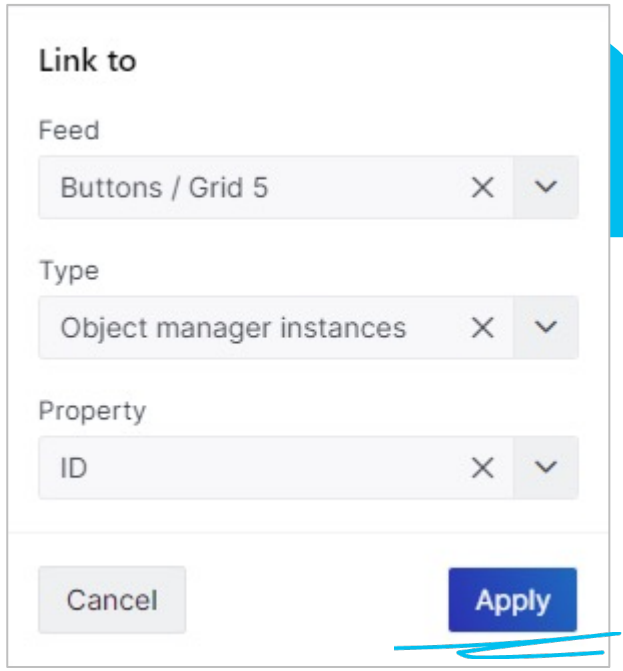
- Delete the connect and disconnect button
- Fill the freed up space by increasing the size of the source and/or destination button grids
- Open the template editor on the sources grid component
- Add a transparent rectangle layer on top of the template, covering the entire button
- Add an 'on click' 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

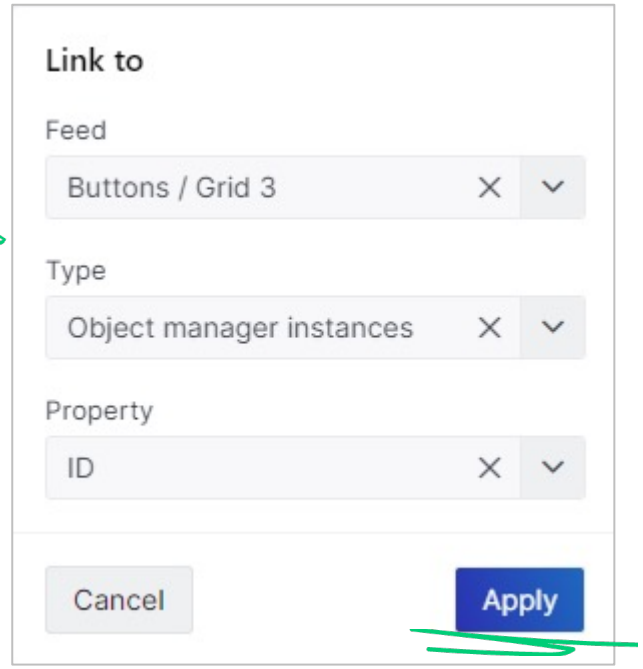
Control Surface

Tweak the behavior of the control surface









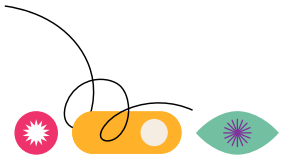
Control Surface

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

empower!

Hardening your DataMiner system

YOUR HOST

Seppe Dejonckheere

Senior Information Security Analyst

TEAM.SECURITY@SKYLINE.BE

VISUAL OVERVIEW
DASHBOARDS
LOW-CODE APPS
GQI

WHAT'S ON THE MENU

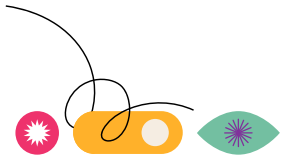
Agenda

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

DataMiner Hardening

HTTP(S)

- HTTP

  Enabled by default

- HTTPS

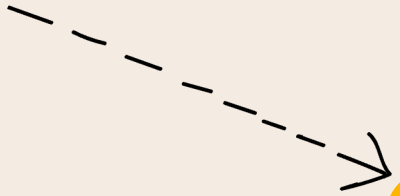
  Best effort

- HTTP Headers

Disable HTTP completely

Redirect HTTP to HTTPS

Make HTTP localhost only



Self-signed certificate

Hostname as FQDN

DataMiner Hardening

NATS

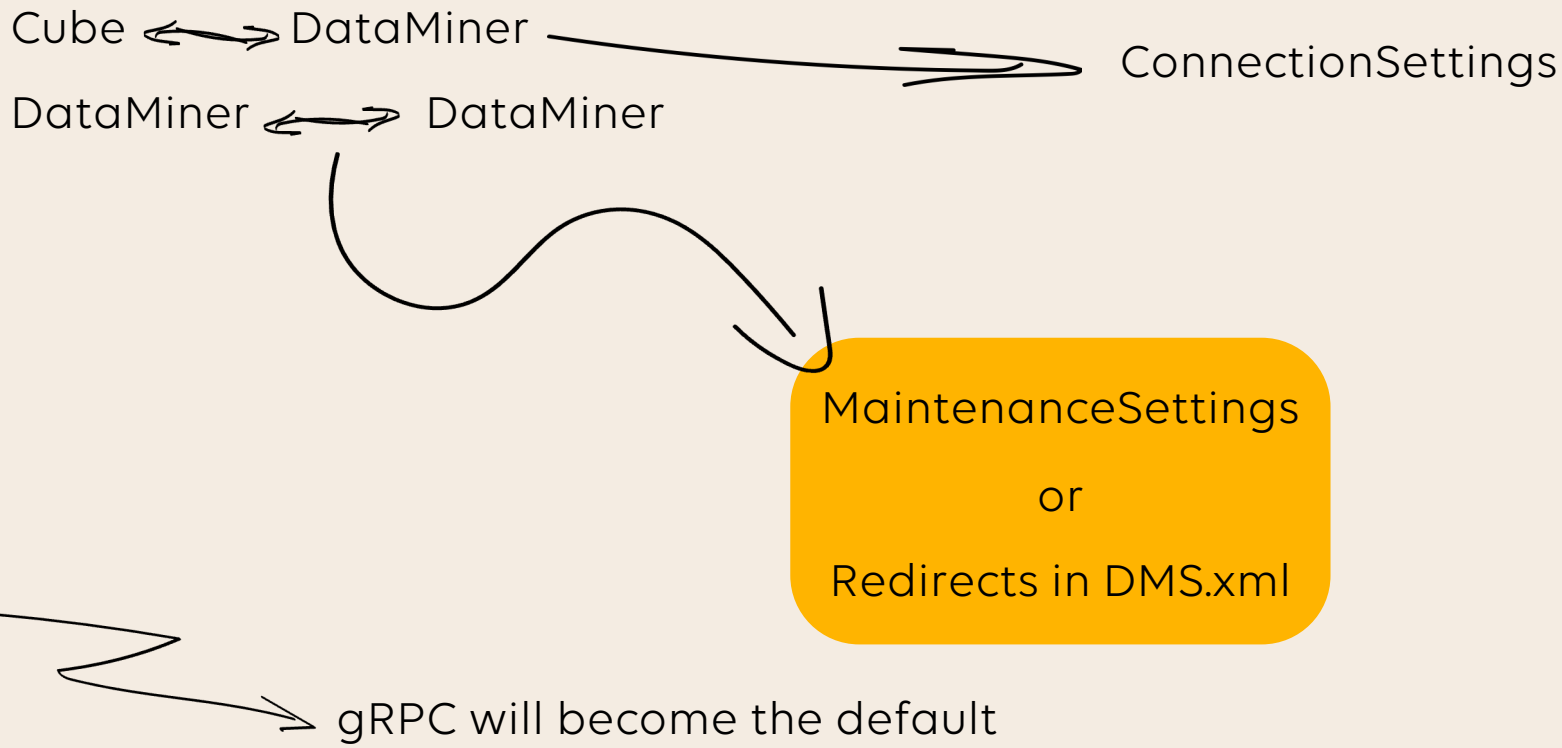
- Unencrypted communication
  - Not an issue for standalone Agents
  - Issue for Clusters and external DxMs

Work in progress to have TLS enabled by default

DataMiner Hardening

RPC protocol

- Switch .NET Remoting to gRPC



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

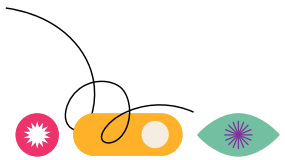
- 'Allow ICMP' rule

→ 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

DataMiner Hardening

TLS version configuration

- TLS versions
  - Configured in Windows
    Windows version dependent
  - TLS 1.0 and 1.1 enabled by default

- Local Administrator
  - Non-revocable admin
    permissions in DataMiner
  - Recommended to disable user
    Only reenable in case of emergency

DataMiner Hardening

Database configuration

- Storage as a Service → Secure by design
- Cassandra Cluster and ElasticSearch/OpenSearch
  - → Authentication enabled?
  - → Default superuser?
  - → DataMiner ⟷ Database TLS?
    Internode TLS?

Detecting and solving issues

“I will take you on”

Get it together ~ De Staat

DataMiner Hardening

Detecting and solving issues

- Detecting issues

Guided by the hardening guide

Generic

Time consuming

Automated by SecurityAdvisoryBpa

Setup specific

Fast

- Solving issues

Detect the points of improvement

The hardening guide points to a step-by-step guide

Solve the issue

Let's have a look

GET INSPIRED

ASK AWAY

empower!