



# Maat

Deployment of Maat (Source of Truth) and network service workflows in PIONIER

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WP6 Task 2

Infoshare

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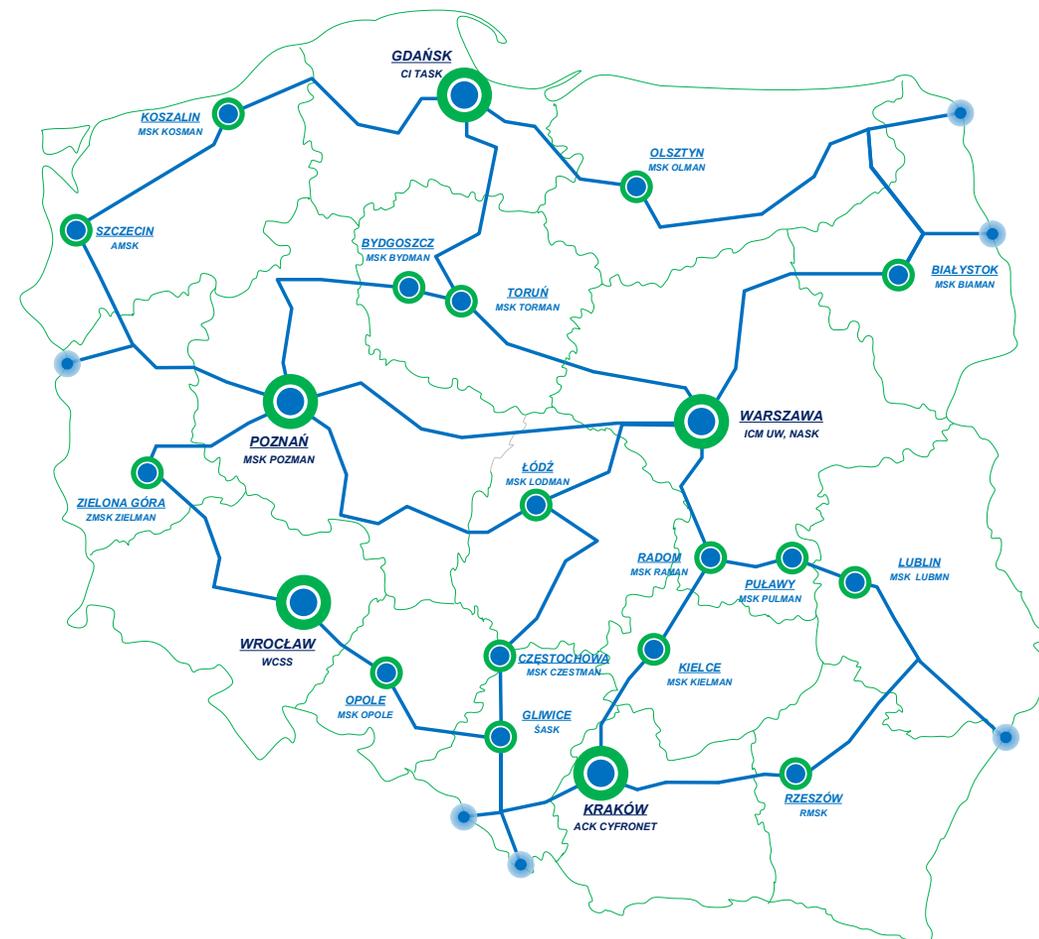
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## Agenda

- PIONIER network update
- Maat in PIONIER orchestration system
- Resources and services modelling
- Orchestration in production infrastructure
- Accelerating the development and deployment process with Maat GUI
- Integrations via REST API

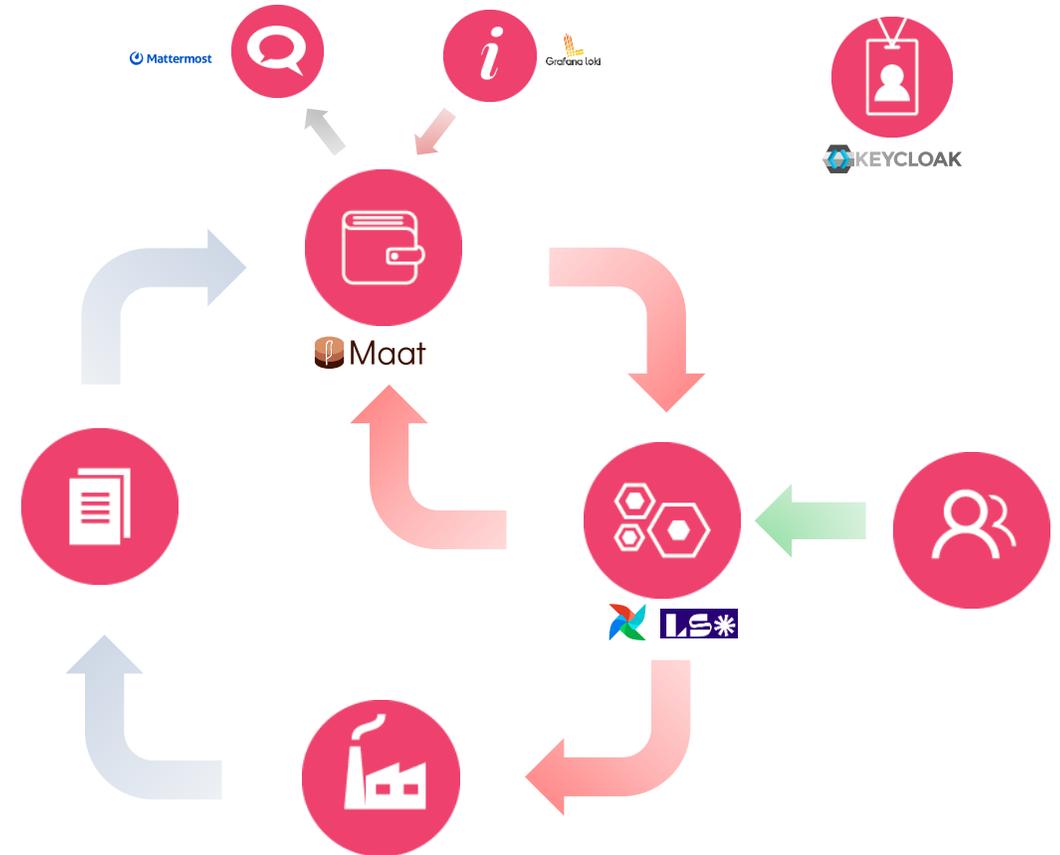
## PIONIER – the network

- 21 scientific and academic MANs (including 5 HPC centers)
- Optical DWDM transmission based on own fibers
- Deploying automation and orchestration platform based on Maat and Apache Airflow
  - MPLS based packet network
    - MX304 (JunOS Trio6)
    - PTX10001-36MR (EVO Express4)
    - ACX7100 Series (EVO Broadcom Jericho2)
    - ACX7024 Series (EVO Broadcom Qumran-2U)
  - Services
    - Routing (Core MPLS, VRFs)
    - Switching (point-to-point, EVPNs)



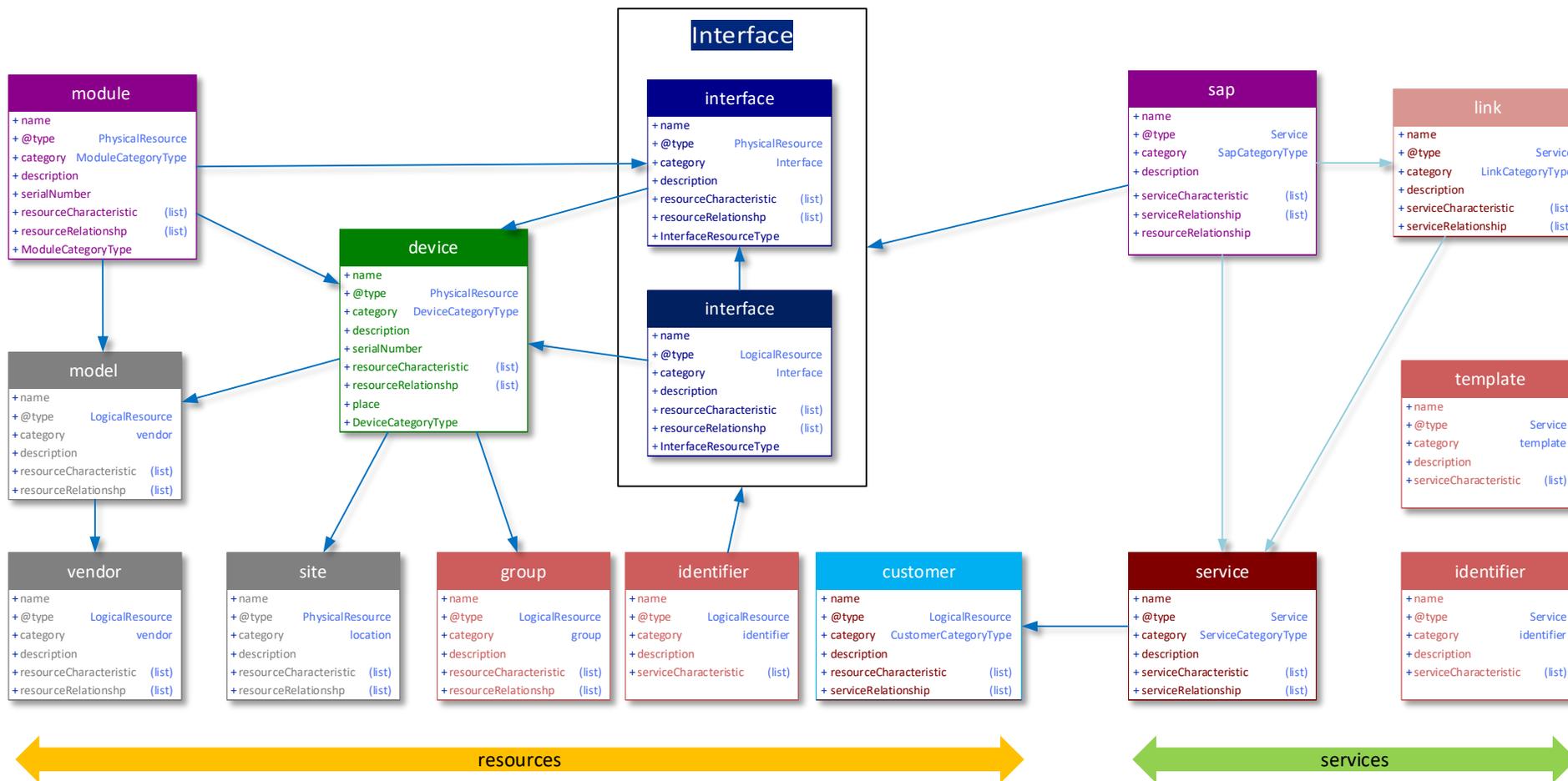
# Maat in PIONIER orchestration system

- Resources and services modelling in Maat
  - Describe resources and services
  - Avoid data duplication
- Workflows
  - Collect user input
  - Interact with Maat via REST API
  - Read existing data
  - Create new object
  - Modify existing objects
  - Control implementation on devices
- Changelog



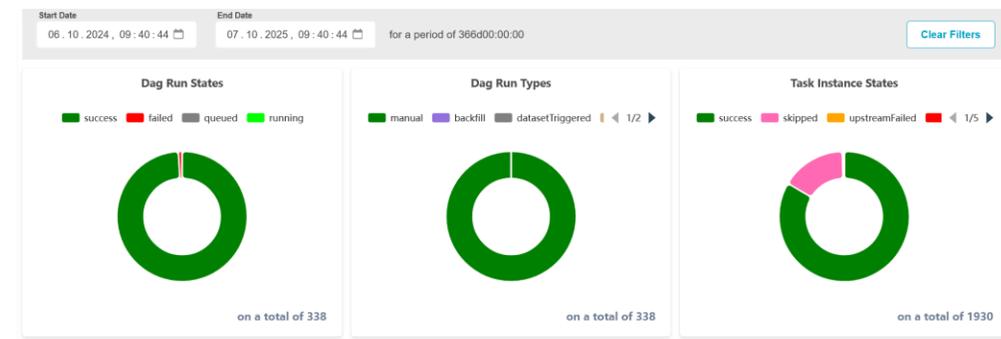
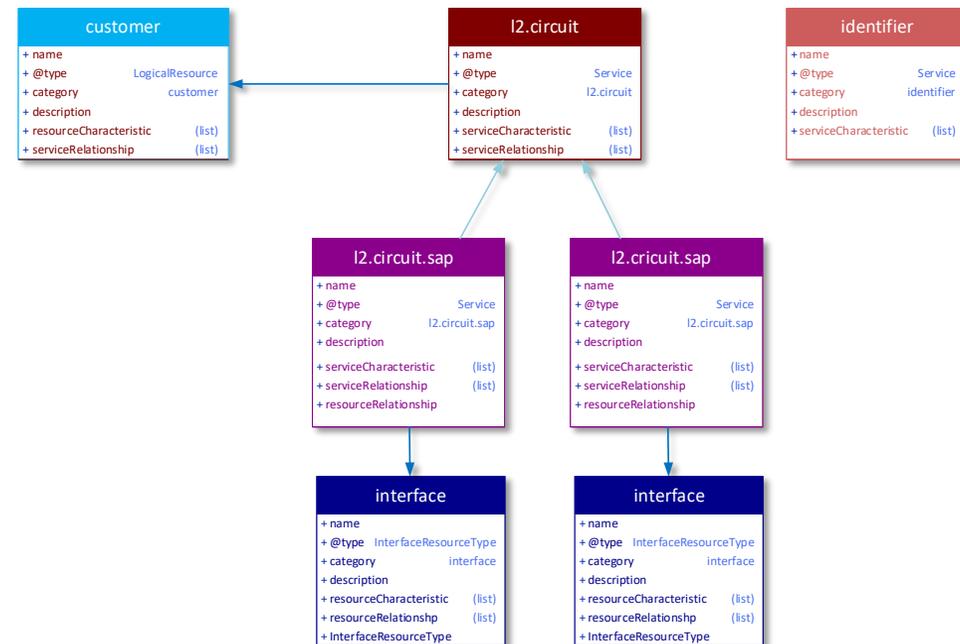
# Resources and services modeling

- TMF based resources and services models



# Orchestration in production infrastructure

- Maat database content
  - Resources (1 400+ objects)
    - Routers
      - Models
      - Vendors
    - Interfaces
    - Customers
    - Sites
  - Services (1 374 objects)
    - **E-LINE (point to point L2 circuits)**
    - Core (links)
    - EVPN
    - VRF
- Workflows (330+ runs)
  - Resources
    - Interface management
  - Services
    - E-LINE (L2 circuit)



# Accelerating the development and deployment process with Maat GUI

- **Administrative (technical) purposes only**
- Quick browsing of database objects
- Manual editing of selected objects
- Fix missing entries or references for manually defined objects or properties on infrastructure

The screenshot shows the Maat GUI interface. At the top, there's a navigation bar with 'Resources' and 'Services' tabs. Below the navigation bar, there's a 'Maat service url' field containing 'https://maat.pionier.net.pl/serviceInventoryManagement/v4.0.0/service'. A 'Create new Service' button is visible. On the left, there's a sidebar with a tree view of database objects, including 'identifier', 'I2.circuit', 'I2.circuit.sap', 'network.core', 'network.core.link', 'network.core.sap', 'I2.evpn', 'I2.evpn.bd', 'I2.evpn.sap', 'I2.circuit.local', 'I3.vrf', and 'I3.vrf.sap'. The main area displays a table of identifiers. The table has columns for 'Actions', 'Name', 'Description', 'Type', 'Category', 'LastUpdateDate', and 'ServiceDate'. One row is visible with the name 'service\_ids', description 'Service identifier for CP', type 'Service', category 'identifier', last update date '2025-09-26T06:02:08Z', and service date '2025-02-07T18:07:24Z'. A 'CREATE NEW IDENTIFIER' button is also present above the table.

Actions	Name	Description	Type	Category	LastUpdateDate	ServiceDate
	service_ids	Service identifier for CP	Service	identifier	2025-09-26T06:02:08Z	2025-02-07T18:07:24Z

# Accelerating the development and deployment process with Maat GUI

- Resources and Services tabs

- Dynamic category pane

- Tabular list of objects

- Text search
- Filtering
- Property display selector

- JSON object overview

The screenshot displays the Maat GUI interface. At the top, there are tabs for 'Resources' and 'Services', with '@type' written above them. The 'Resources' tab is active. Below the tabs, there is a 'Maat service url:' field containing 'https://maat.pionier.net.pl/resourceInventoryManagement/v4.0.0/resource'. A 'Create new Resource' button is visible. On the left, a dynamic category pane is shown with a list of categories: vendor, model, customer, site, device.router, interface (highlighted), group, and identifier. A red bracket labeled 'category' points to this pane. The main area shows a 'Table' view of resources. At the top of the table is a 'CREATE NEW INTERFACE' button and a search bar. The table has columns: Actions, Name, Description, Type, Category, UsageState, and StartOperatingDate. Below the table, there is a pagination control showing 'Rows per page 10' and '1-10 of 1324'.

Actions	Name	Description	Type	Category	UsageState	StartOperatingDate
	et-0/0/0	Not used	PhysicalResource	interface	idle	2025-02-07T18:07:39Z
	et-0/0/4	== Bialystok d4 1/8/c1 ==	PhysicalResource	interface	busy	2025-02-07T18:07:39Z
	et-0/0/5	Not used	PhysicalResource	interface	idle	2025-02-07T18:07:39Z
	et-0/0/6	Not used	PhysicalResource	interface	idle	2025-02-07T18:07:39Z
	et-0/0/7	Not used	PhysicalResource	interface	idle	2025-02-07T18:07:39Z
	et-0/0/8	-- Mikolajki d4 1/9/c1 --	PhysicalResource	interface	active	2025-02-07T18:07:39Z
	et-0/0/9	Not used	PhysicalResource	interface	idle	2025-02-07T18:07:40Z
	et-0/0/10	-- OLMAN (man) --	PhysicalResource	interface	active	2025-02-07T18:07:40Z
	et-0/0/11	Not used	PhysicalResource	interface	idle	2025-02-07T18:07:40Z
	et-0/0/12	Not used	PhysicalResource	interface	idle	2025-02-07T18:07:40Z

# Accelerating the development and deployment process with Maat GUI

- Object attributes overview and editing
- Define new attributes
  - Schema validation applied by Maat API
- Dynamic links to referenced objects

The screenshot displays the Maat GUI interface for editing a resource object. The top navigation bar includes the Maat logo, 'Resources', and 'Services' tabs. The main content area is divided into a left sidebar with a tree view of resource categories (vendor, model, customer, site, device.router, interface, group, identifier) and a main editing area. The editing area shows the 'Maat service url' and a 'Submit edited object' button. The resource is configured with the following attributes:

- category:** interface
- description:** -- GEANT CBPIO (ae6) --
- name:** et-0/0/4
- resourceCharacteristic:** A table with one row:
 

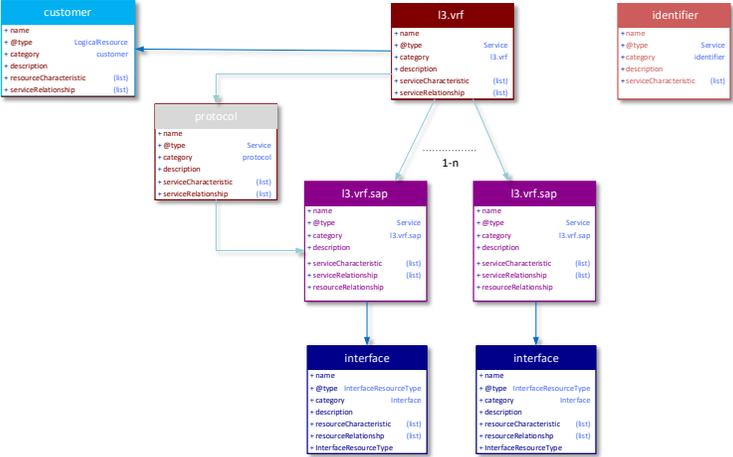
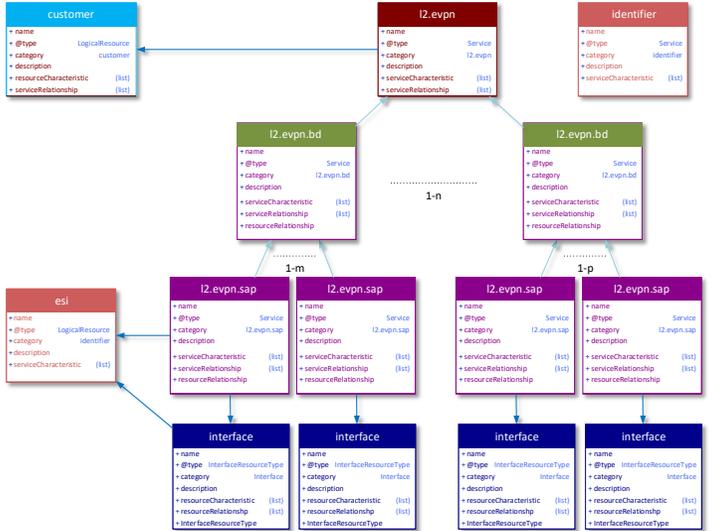
Actions	Name	Value
	speed	100G
- @schemaLocation:** <https://bitbucket.software.geant.org/projects/OSSBSS/repos/maat-schema/raw/TMF639-ResourceInventory-v4-pionier.json>
- @type:** PhysicalResource
- usageState:** busy
- resourceRelationship:** A table with two rows:
 

Actions	RelationshipType	Resource.id	Resource.href	Resource.name
	brf.device.router	12a9744d-ca4e-448e-b5e2-e5b82ee3e945	<a href="https://maat.pionier.net.pl/443/resourceInventoryManagement/v4.0.0/resource/12a9744d-ca4e-448e-b5e2-e5b82ee3e945">https://maat.pionier.net.pl/443/resource/12a9744d-ca4e-448e-b5e2-e5b82ee3e945</a>	ptx-poz-1
	brf.interface	8d5802fa-ef9e-4c53-8a4e-37c8d3a13f54	<a href="https://maat.pionier.net.pl/443/resourceInventoryManagement/v4.0.0/resource/8d5802fa-ef9e-4c53-8a4e-37c8d3a13f54">https://maat.pionier.net.pl/443/resourceInventoryManagement/v4.0.0/resource/8d5802fa-ef9e-4c53-8a4e-37c8d3a13f54</a>	ae6

# Accelerating the development and deployment process with Maat GUI

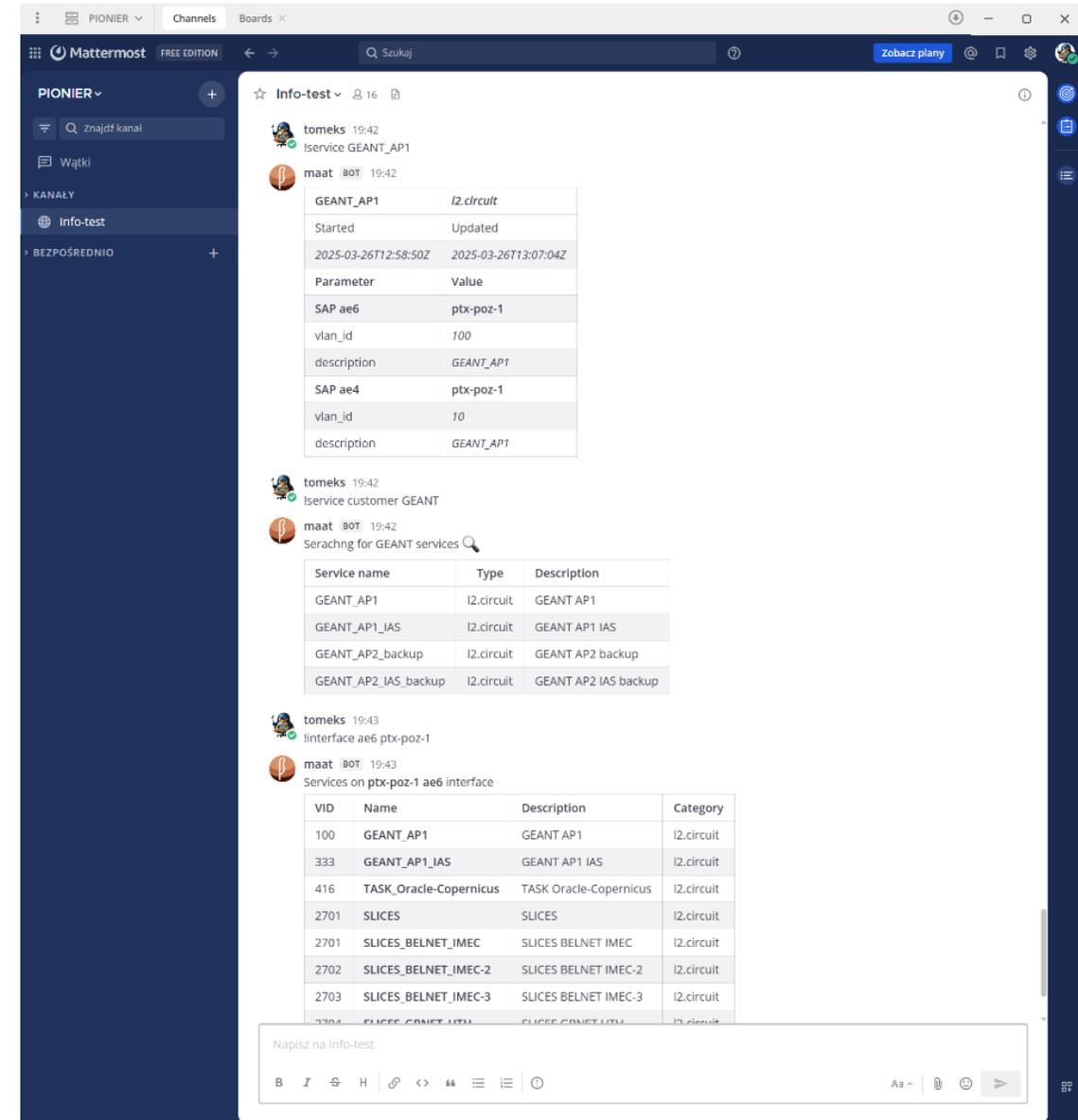
- New data models ready for workflow development and implementation

- EVPN
- VRF
- Protocols (BGP)
- Routing policies



# Integrations via REST API

- Interface between Mattermost channel and Maat database
  - Quick lookup for services, resources and parameters
  - Errbot based 



The screenshot shows a Mattermost chat window for a channel named 'Info-test'. The chat history includes:

- A message from 'tomeks' at 19:42: 'Iservice GEANT\_AP1'.
- A response from the bot 'maat' at 19:42 showing a table of service details:

Parameter	Value
GEANT_AP1	I2.circuit
Started	Updated
2025-03-26T12:58:50Z	2025-03-26T13:07:04Z
SAP ae6	ptx-poz-1
vlan_id	100
description	GEANT_AP1
SAP ae4	ptx-poz-1
vlan_id	10
description	GEANT_AP1

- A message from 'tomeks' at 19:42: 'Iservice customer GEANT'.
- A response from the bot 'maat' at 19:42: 'Seraching for GEANT services'.
- A table of search results:

Service name	Type	Description
GEANT_AP1	I2.circuit	GEANT AP1
GEANT_AP1_IAS	I2.circuit	GEANT AP1 IAS
GEANT_AP2_backup	I2.circuit	GEANT AP2 backup
GEANT_AP2_IAS_backup	I2.circuit	GEANT AP2 IAS backup

- A message from 'tomeks' at 19:43: 'Iinterface ae6 ptx-poz-1'.
- A response from the bot 'maat' at 19:43: 'Services on ptx-poz-1 ae6 interface'.
- A table of interface services:

VID	Name	Description	Category
100	GEANT_AP1	GEANT AP1	I2.circuit
333	GEANT_AP1_IAS	GEANT AP1 IAS	I2.circuit
416	TASK_Oracle-Copernicus	TASK Oracle-Copernicus	I2.circuit
2701	SLICES	SLICES	I2.circuit
2701	SLICES_BELNET_IMEC	SLICES BELNET IMEC	I2.circuit
2702	SLICES_BELNET_IMEC-2	SLICES BELNET IMEC-2	I2.circuit
2703	SLICES_BELNET_IMEC-3	SLICES BELNET IMEC-3	I2.circuit
2704	SLICES_BELNET_IMEC-4	SLICES BELNET IMEC-4	I2.circuit

The chat interface includes a search bar at the top, a channel sidebar on the left, and a message input area at the bottom with a text area and a 'Napisz na Info-test' button.



# Thank You

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