SENTINEL 5 - PROCESSING AT THE EWC WITH BPMN-BASED WORKFLOW MANAGEMENT PROCESSOR (WMP)

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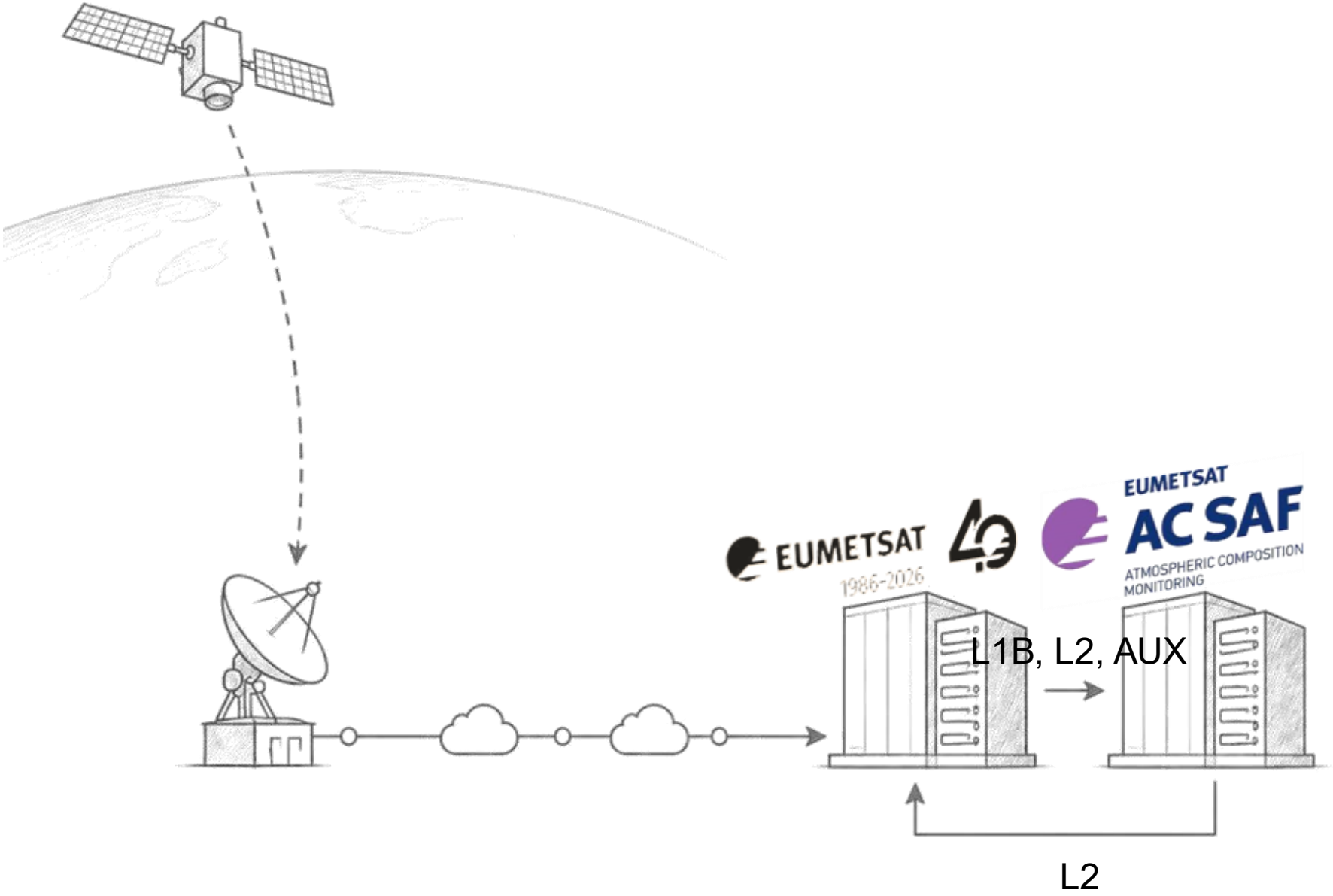
1) DLR – German Aerospace Center (DLR-DFD/INF)
2) Werum Software AG
3) DLR – German Aerospace Center (DLR-DFD/NBS)

Overview

- Who we are
- Requirements for AC SAF
- Workflow Orchestration:
  - BPMN
  - Workflow Management Processor (WMP)
- Using the EWC:
  - Setting up the Infrastructure
- First experiences

Who we are…

- Institute of DLR
- Main-Sites: Oberpfaffenhofen, Neustrelitz
- Develop and integrat information technology systems and platforms to manage and process large data inventories.



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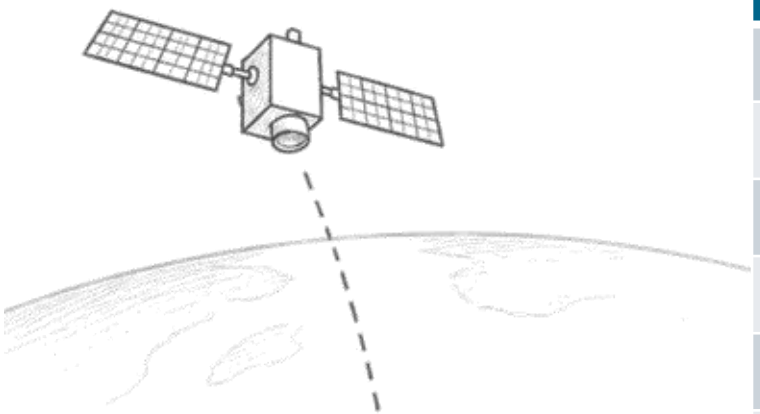

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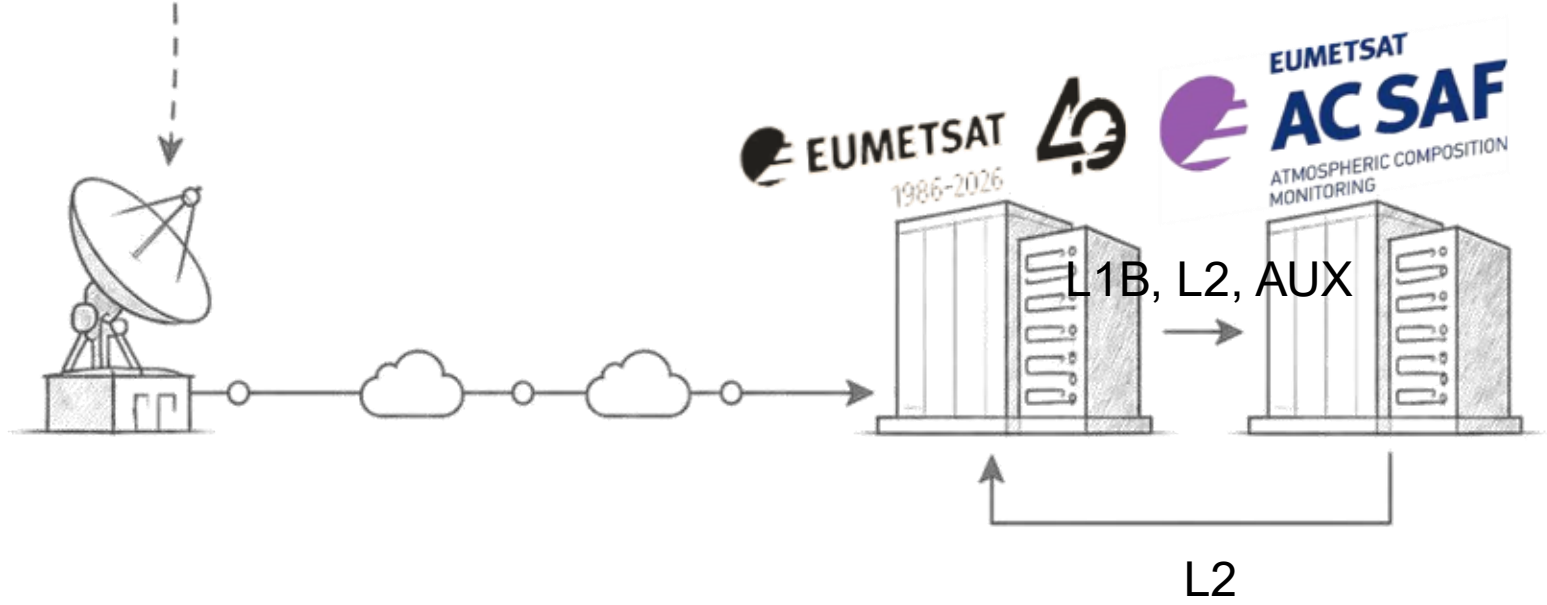
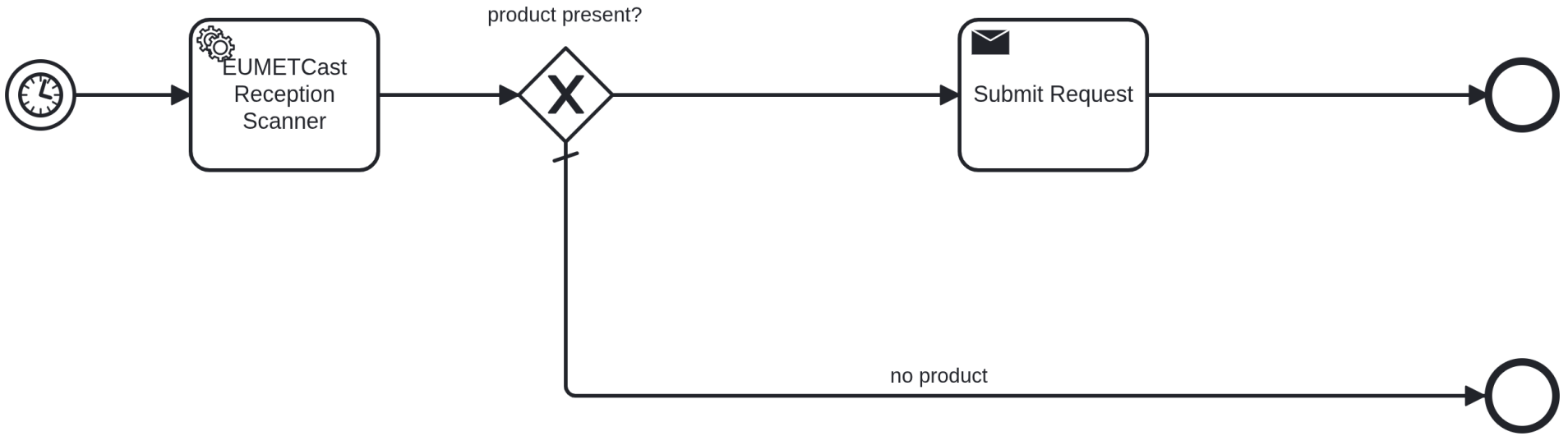
CLD	Mandatory	Mandatory	
AUX	Mandatory	Mandatory	
O3		Mandatory	
NO2		Mandatory	
Background	Mandatory	Mandatory	
IRR	Mandatory	Mandatory	Mandatory



AI-generated.

Workflow Orchestration

- Business Process Model and Notation 2.0



Workflow Orchestration

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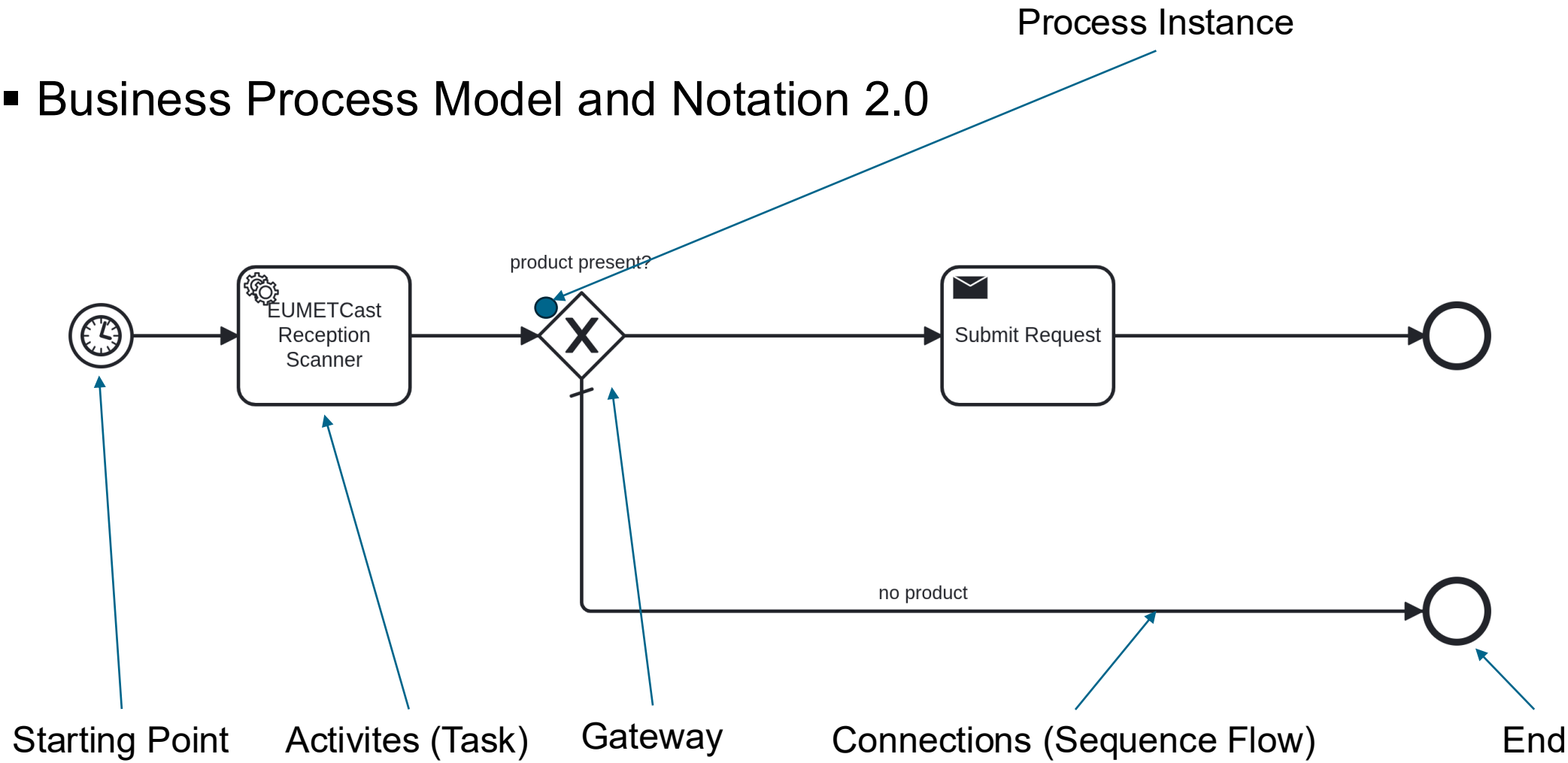
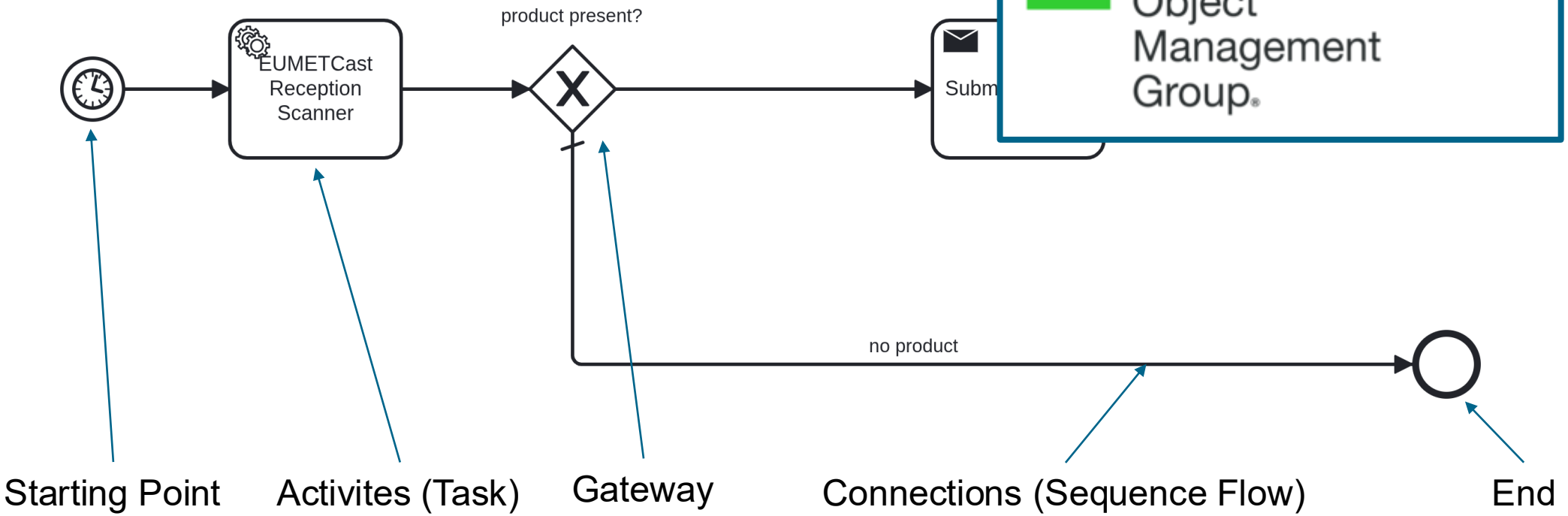


BPMN

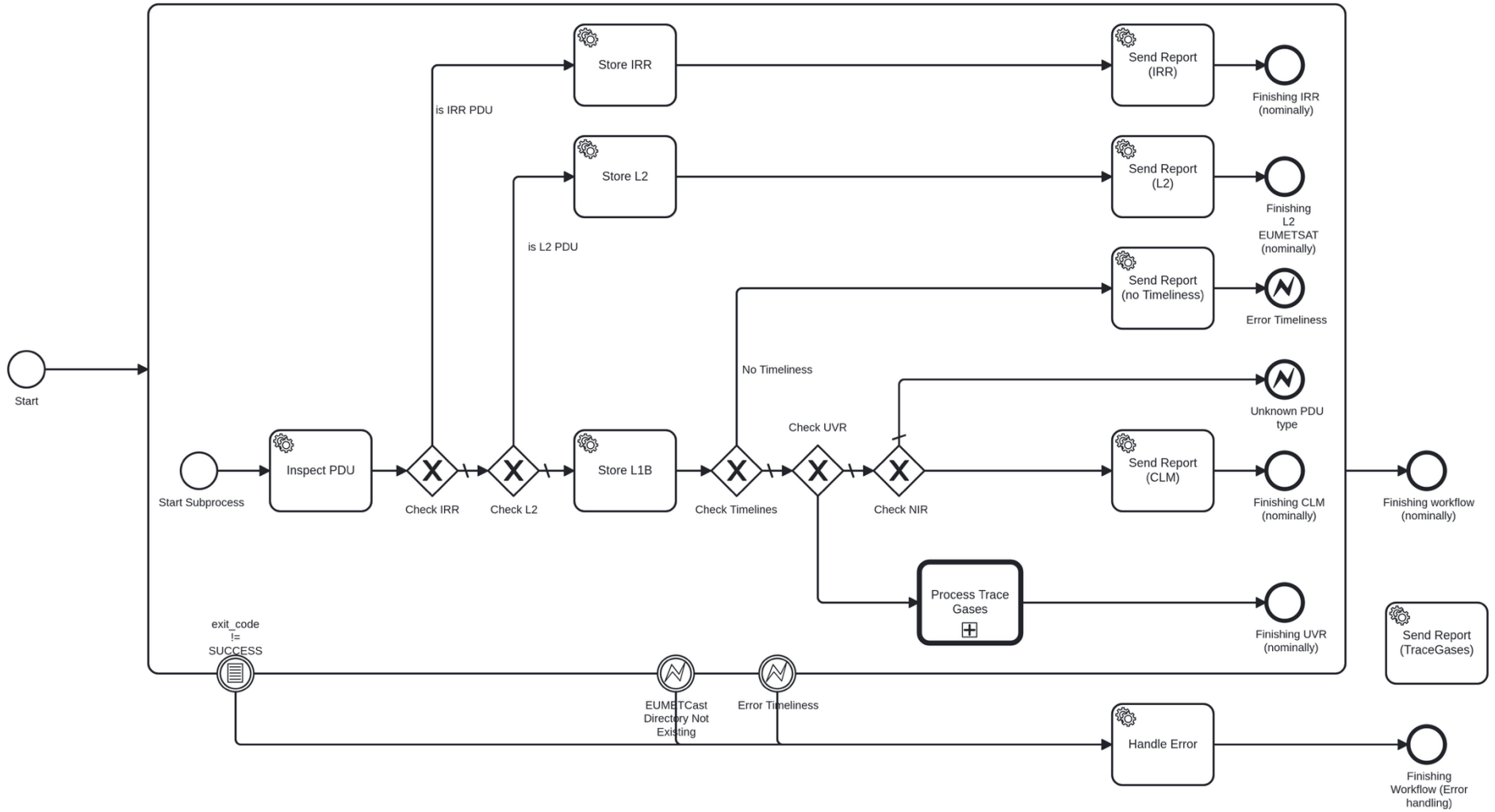
BPMN 1.0:
Released in 2004

BPMN 2.0:
Released in 2011 by OMG

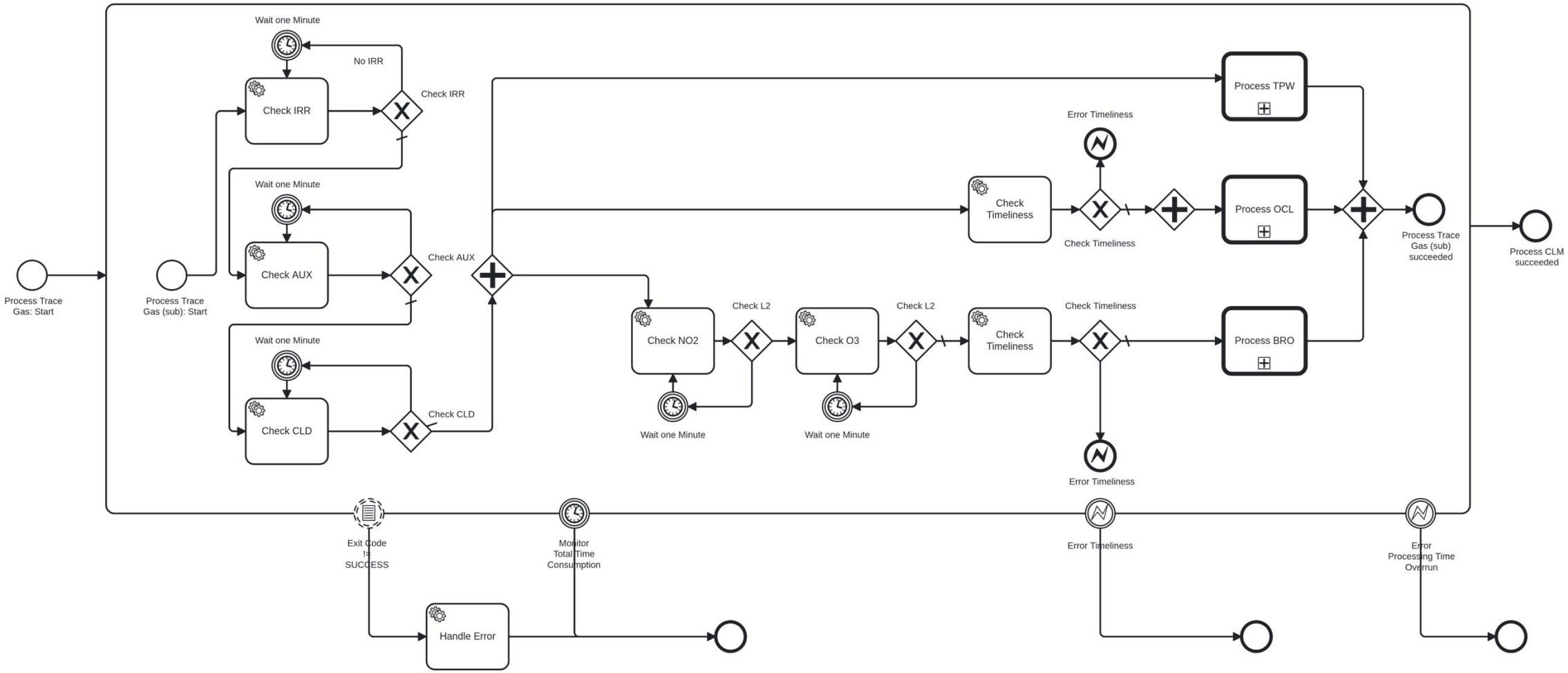
- Business Process Model and Notation 2.0



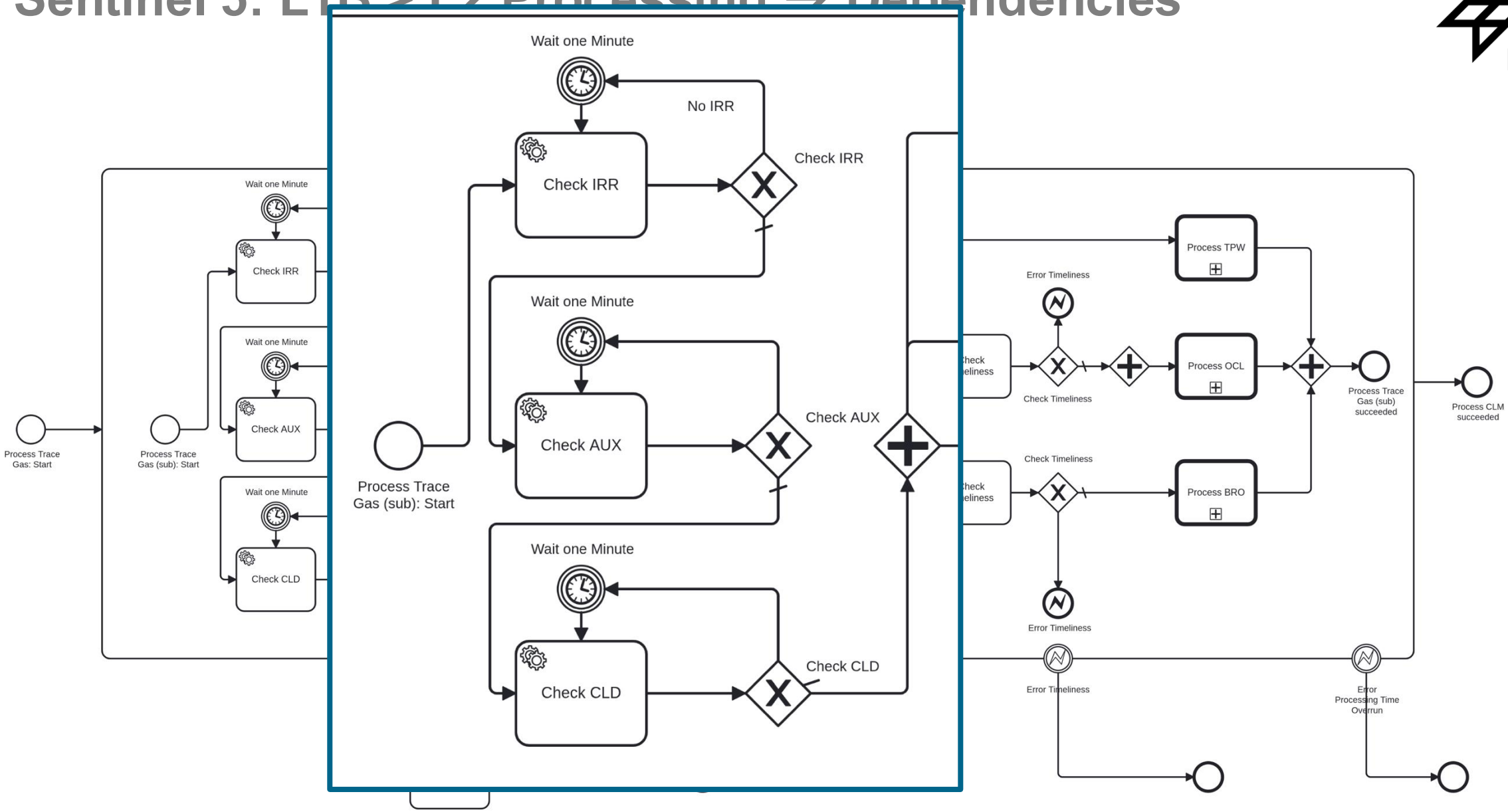
Sentinel 5: L1B > L2 Processing



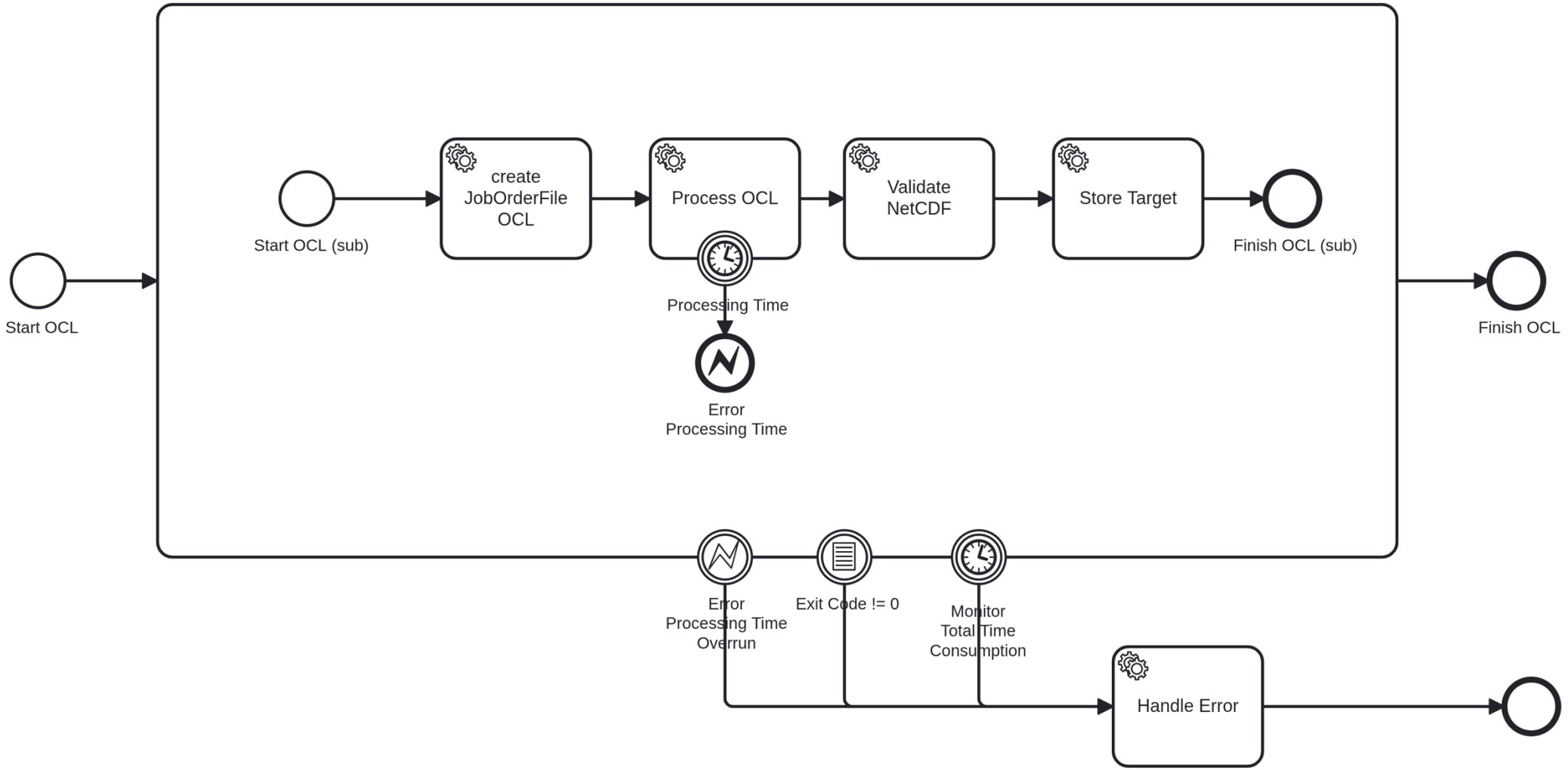
Sentinel 5: L1B > L2 Processing → Dependencies



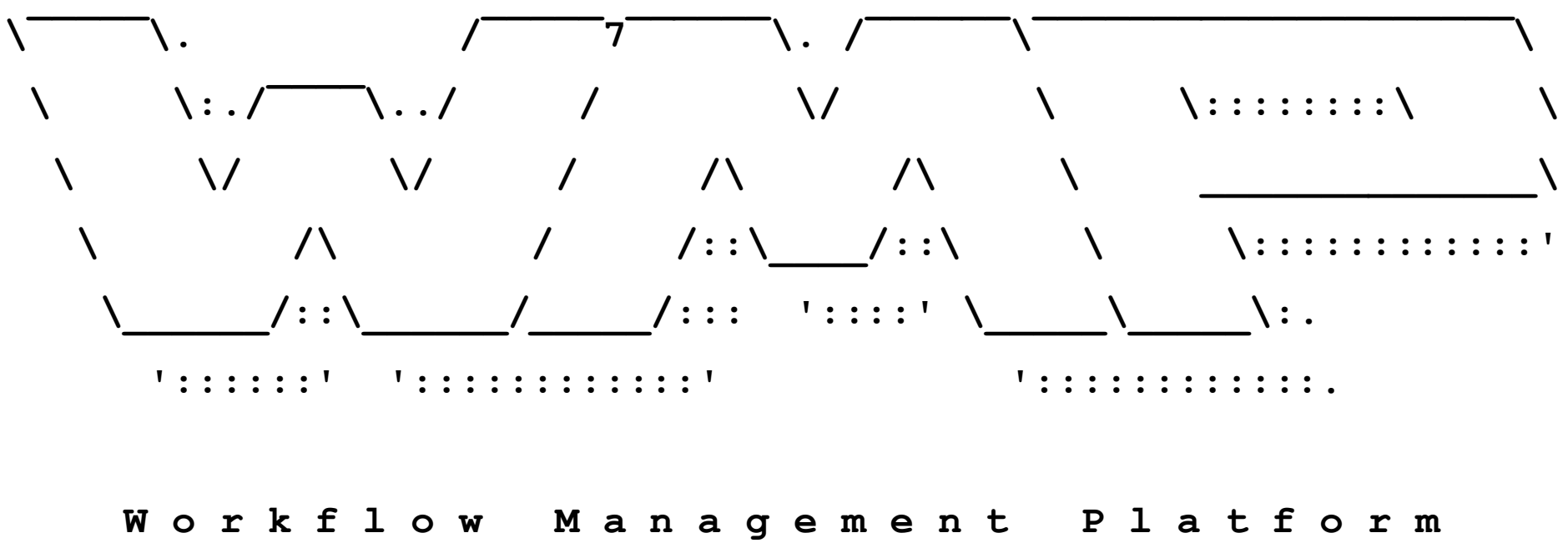
Sentinel 5: L1B > L2 Processing → Dependencies



Sentinel 5: L1B > L2 Processing



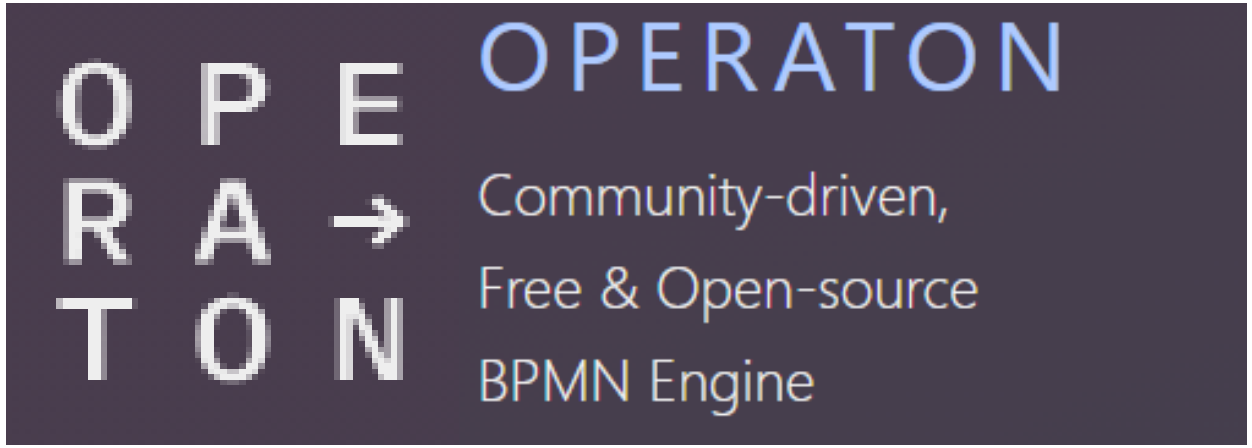
Workflow Management Processor (WMP)



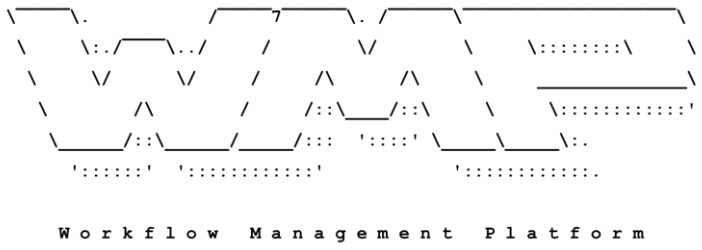
- Developed by DLR + Werum AG, Lüneburg, Germany:

Workflow Management Processor (WMP)

- Developed by DLR + Werum AG, Lüneburg, Germany
- Based on

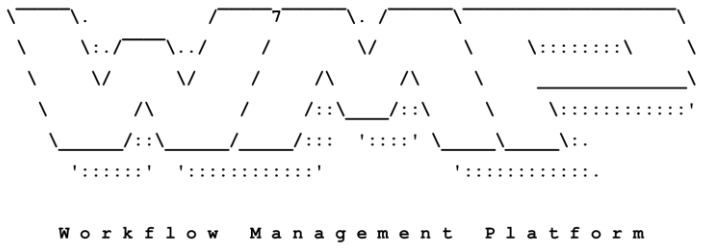


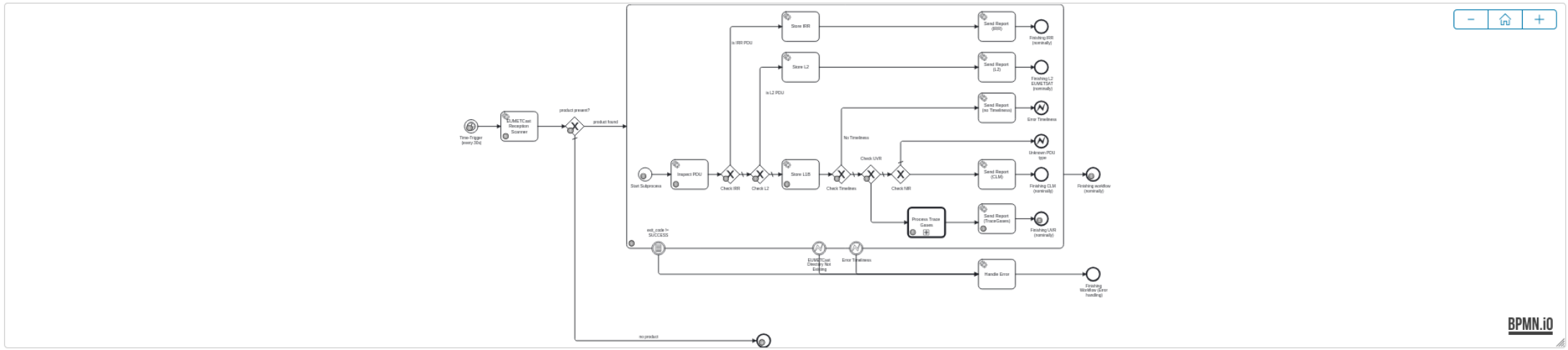
(formerly known as Camunda 7.0).



WMP Features

- 100% OPERATON features
- External tasks:
  - Java
  - Python
  - Tasks are triggered by WMP (no external microservices required)
  - Tasks are stored in
    - **task archives** with
    - **version ID**.
- Logging





Filter (found: 5) | Process Definition (Process_Sentinel-5)

Process definition selection

Process_Sentinel-5 | 1 | Incidents: 0

Process Instance

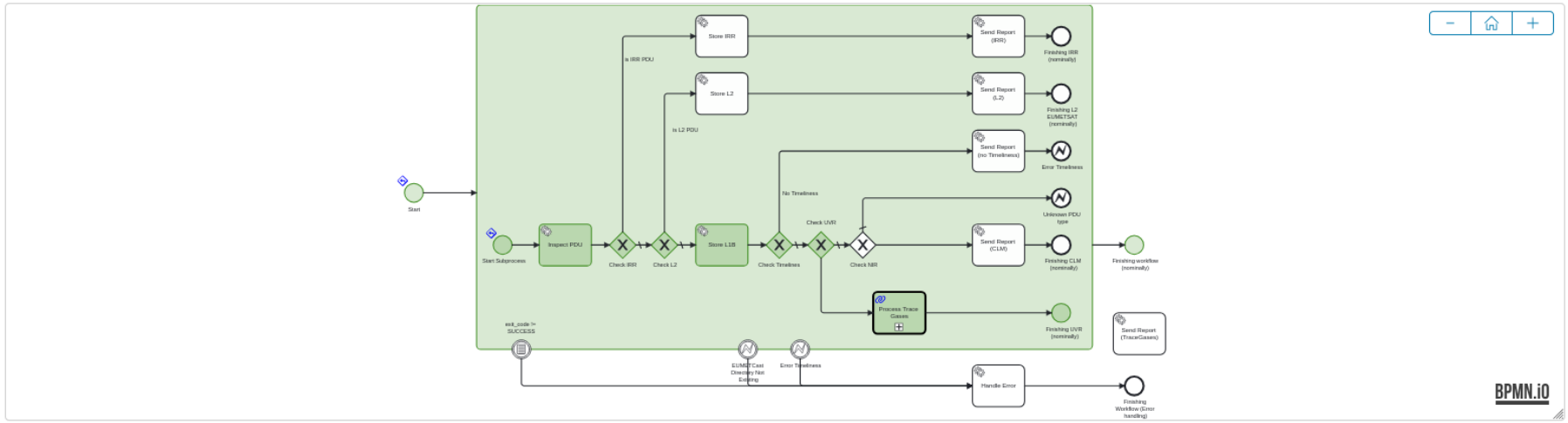
No Process Instance selected

Process Filter

Select an activity | Waiting instances | Incidents only | Select a state | From 24.July.2026 10:17 | To 24.July.2026 10:17 | Show historic Labels

Reload | Restart Selected Jobs | Suspend Selected Jobs | Terminate Selected Jobs

Process Key	Process Instance	Request ID	State	Start Time	Last Activity Start	Last Activity End	Message
Process_Sentinel-5			COMPLETED	2026-07-24T10:16:50.068+0200	2026-07-24T10:16:51.247+0200	2026-07-24T10:16:51.247+0200	
Process_Sentinel-5			COMPLETED	2026-07-24T10:17:26.260+0200	2026-07-24T10:17:28.942+0200	2026-07-24T10:17:28.942+0200	



BPMN Information

Name: Activity_processTraceGased

Filter (found: 1) | Process Definition (Process_Sentinel-5) | ProcessInstance (97910f42-b11d-11f1-8f9d-fa163e3c30ad)

Process definition selection

Process_Sentinel-5 | 1 | Incidents: 0

Process Instance

97910f42-b11d-11f1-8f9d-fa163e3c30ad

Process Filter

Inspect PDU | Waiting instances | Incidents only | Select a state | From 15.September.2026 17:59 | To 15.September.2026 17:59 | Show historic Labels

WMP Log | Process Instance Parameters | BPMN Parameters | Incidents | Audit Log | Job Log

Search

No Logs available

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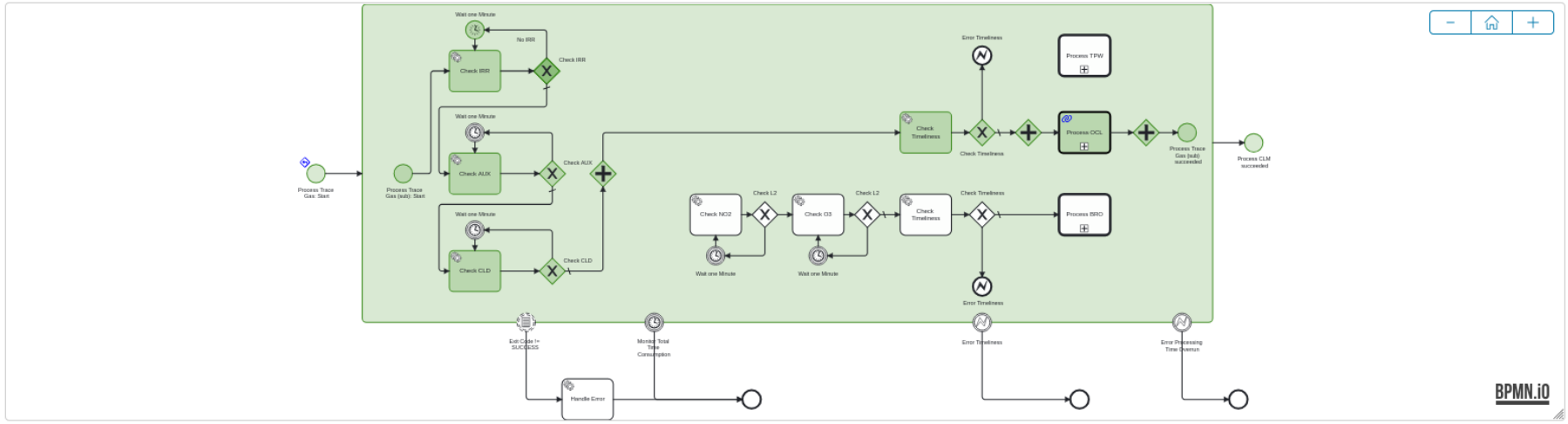
Workflow Management Platform



BPMN Information

Name: Activity_processTraceGased

Filter (found: 1) | Process Definition (Process_Sentinel-5_TraceGases) | ProcessInstance (9c9870fc-b11d-11f1-8f9d-fa163e3c30ad)

Process definition selection

Process_Sentinel-5_TraceGases | 1 | Incidents: 0

Process Instance

9c9870fc-b11d-11f1-8f9d-fa163e3c30ad

Process Filter

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Workflow Management Platform
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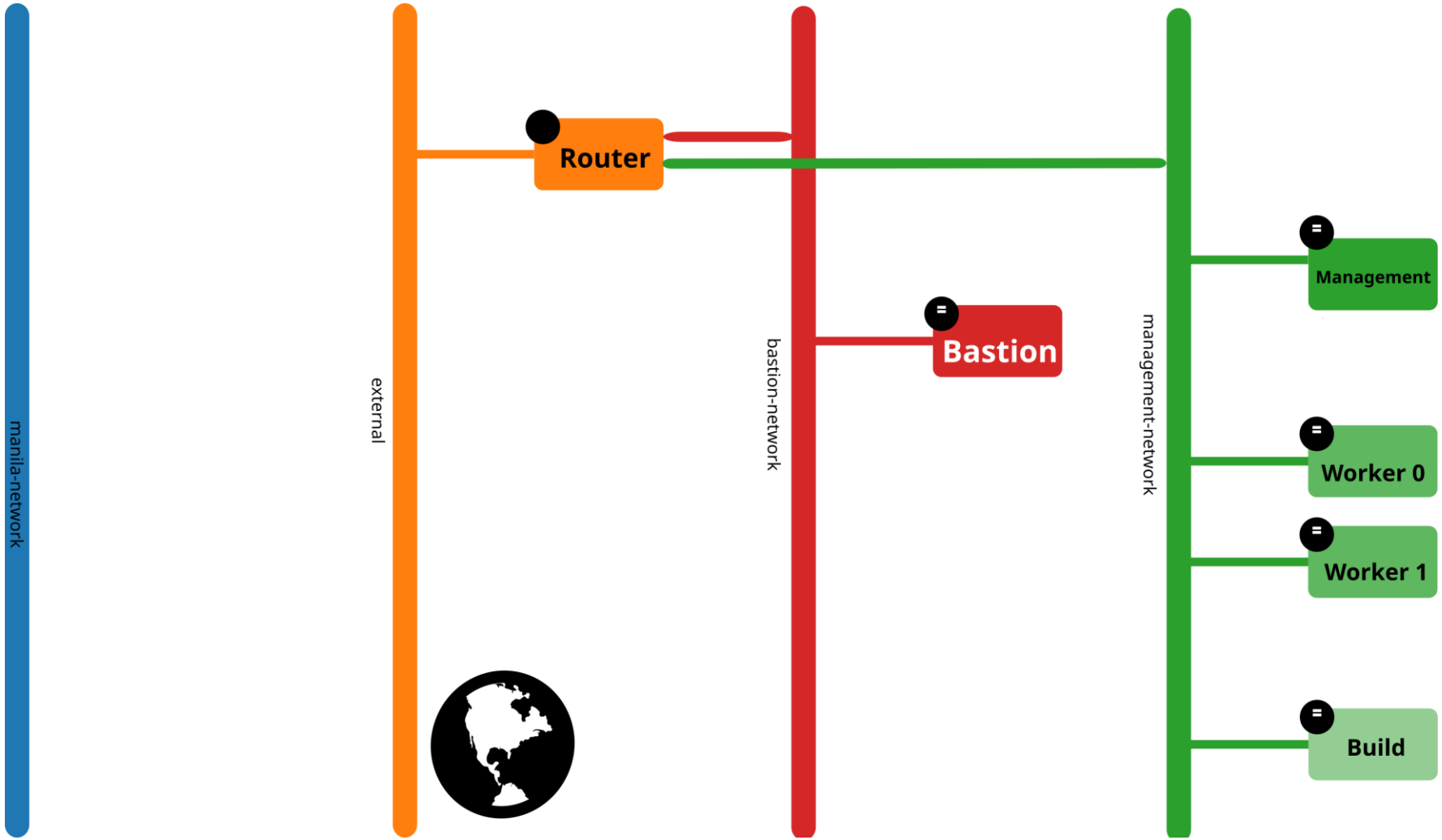
Network infrastructure on EWC



Infrastructure as Code (IaC)

- OpenStack to query specific aspects of the infrastructure
- Terraform to
  - build,
  - destroy and
  - rebuild the complete infrastructure.
- Java + WMP: Main software (running as Spring Boot application)
- Tasks implemented in Python (using Python Installer → No need for Python)
- Docker (on the worker nodes, processors are in C/C++)
- Influx DB, Telegraph and Grafana for monitoring

First Experiences

AI-generated.

Questions?

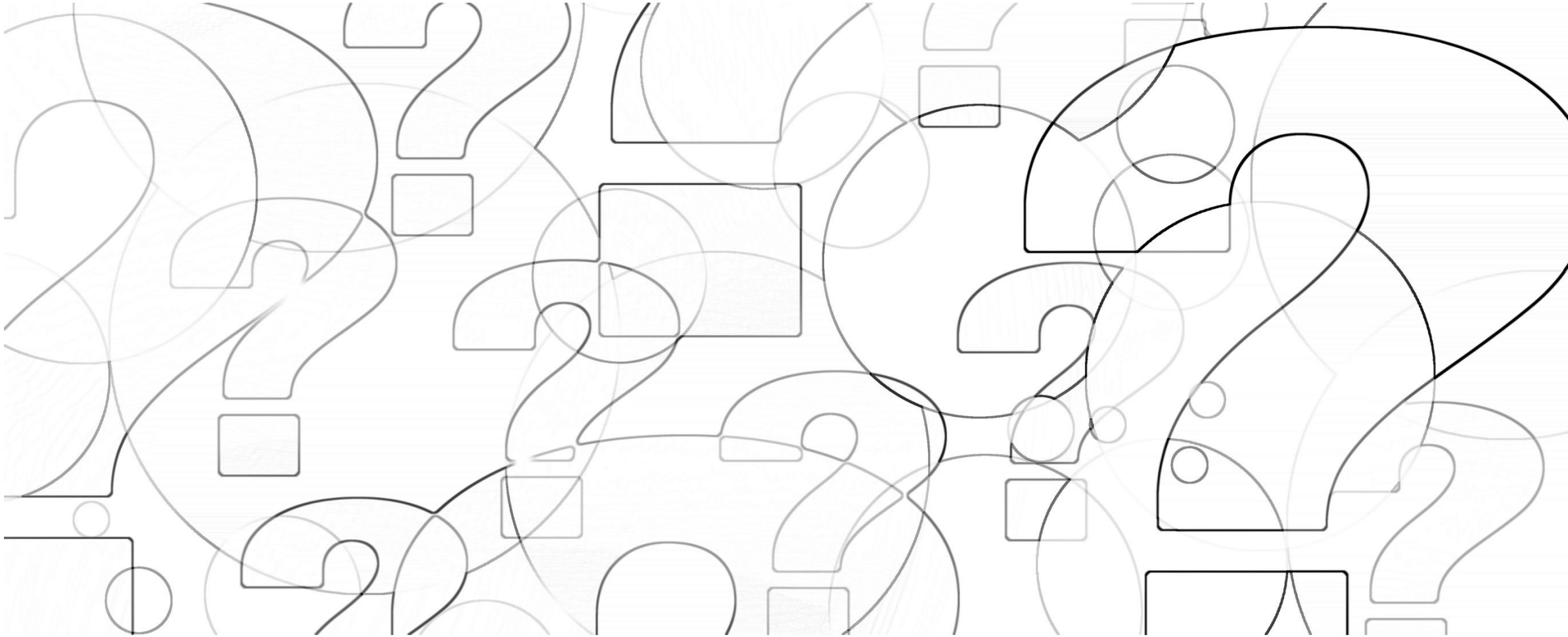


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Image sources:	All images “DLR (CC BY-NC-ND 3.0)” unless otherwise stated