

WORKSHOP GARR 2025

NET MAKERS

Workflow Orchestrator in campo l'esperienza con la rete ottica GARR-T

Matteo Colantonio & Filippo Landini

GARR

01

Matteo Colantonio

Automazione Rete Ottica

02

Filippo Landini

Architettura del Software

01

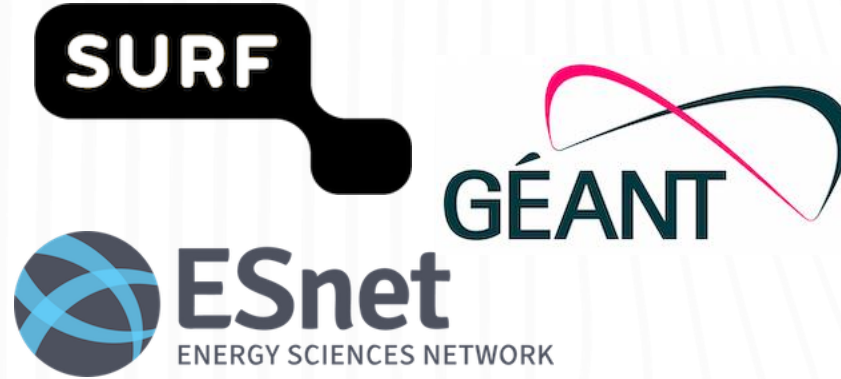
Matteo Colantonio

Automazione Rete Ottica



Workflow Orchestrator

Maintained by



Used by



REANVZ



cesnet



workfloworchestrator.org



Workflow Orchestrator

Orchestratore: Sistema per...

- i. gestire intero ciclo vita servizi
- ii. coordinare azioni su sistemi informativi (IPAM, IRM, BSS, ...) oltre che apparati

Workflow: procedura/checklist



workfloworchestrator.org



Demo

creazione, modifica, verifica,
terminazione servizio 100GbE

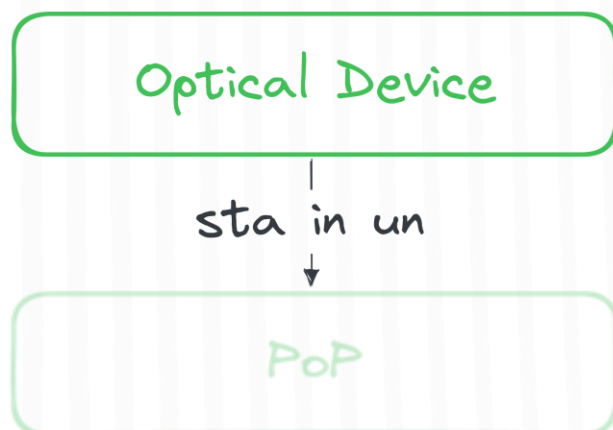
Cosa c'è dietro: modelli astratti, modulari e minimali

PoP

The screenshot displays the Workflow Orchestrator interface. At the top, the header shows "Workflow Orchestrator" and "WFO dev TILT". A status bar indicates "Engine is RUNNING" with a green checkmark and "0". The breadcrumb trail is "Start / Subscriptions / 137c7c3d-74ab-49ef-b644-1e28f9508666". The main title is "BA01-bari (Point of Presence)" with a green lightning bolt icon and an "Actions" dropdown menu. Below the title, there are two status tags: "active" and "in-sync". The navigation tabs include "Service configuration", "General", "Workflows", and "Related subscriptions". The "Product blocks" section shows a list with "BA01-bari" selected. A detailed view for "BA01-bari" (PoP) is shown on the right, with a "Show details" button. The details table is as follows:

Code	BA01
Full Name	BA01-bari
Garrxdb Id	0
Netbox Id	0

Cosa c'è dietro: modelli astratti, modulari e minimali



Workflow Orchestrator "WFO dev TILT" Engine is RUNNING 0

Start / Subscriptions / 5b93faa6-7e9d-4237-a456-0d60ff2f19d8

flex.ba01.garr.net (Infinera FlexLS) ⚡

active in-sync

Service configuration General Workflows Related subscriptions

Product blocks

Show all Select by name

- Infinera FlexLS flex.ba01.garr.net
- BA01-bari

Infinera FlexLS flex.ba01.garr.net

OpticalDevice

Device Type	ROADM
Fqdn	flex.ba01.garr.net
Mngmt Ip	
Nms Uuid	c51d1cfc-457c-38da-83be-98d9c202e963
Platform	FlexLS
Vendor	Infinera

Cosa c'è dietro: modelli astratti, modulari e minimali



Workflow Orchestrator "WFO dev TILT" Engine is RUNNING 0

Start / Subscriptions / b3ab3a3b-537f-4a63-a896-adbfc1584405

g30.bo01.garr.net port-1/1/1 --- flex.bo01.garr.net 1-E1-1-T2A ⚡

active in-sync

Service configuration General Workflows Related subscriptions

Product blocks

Show all Select by name

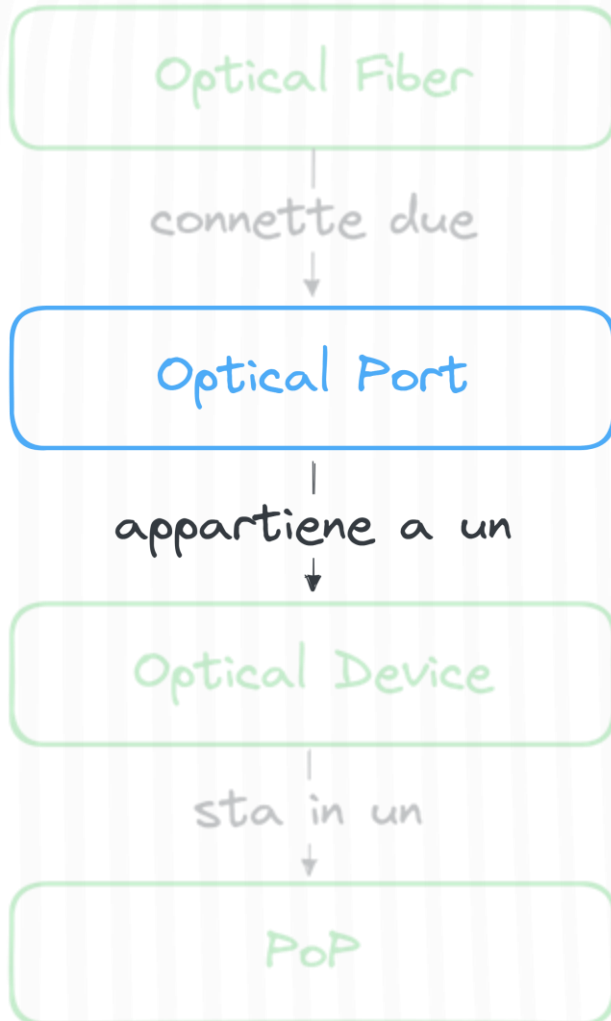
- g30.bo01.garr.net port-1/1/1 --- flex.bo01.garr.net... x
 - flex.bo01.garr.net 1-E1-1-T2A
 - g30.bo01.garr.net port-1/1/1

g30.bo01.garr.net port-1/1/1 --- flex.bo01.garr.net 1-E1-1-T2A

OpticalFiber

Instance ID	a55881b3-7765-4e01-9ca3-8a6e73981b44
Owner subscription ID	Current subscription
In-use by subscription(s)	None
Fiber Name	g30.bo01.garr.net port-1/1/1 --- flex.bo01.garr.net 1-E1-1-T2A
Fiber Types	
Garrxdb Id	
Lengths	
Terminations	
Total Loss	

Cosa c'è dietro: modelli astratti, modulari e minimali



Workflow Orchestrator "WFO dev TILT" Engine is RUNNING 0

Start / Subscriptions / b3ab3a3b-537f-4a63-a896-adbfc1584405

g30.bo01.garr.net port-1/1/1 --- flex.bo01.garr.net 1-E1-1-T2A ⚡

active in-sync

Service configuration General Workflows Related subscriptions

Product blocks

Show all Select by name

- g30.bo01.garr.net port-1/1/1 --- flex.bo01.garr.net...
- flex.bo01.garr.net 1-E1-1-T2A
- g30.bo01.garr.net port-1/1/1

flex.bo01.garr.net 1-E1-1-T2A

OpticalDevicePort

Instance ID: 48a73900-0cc7-4209-823c-03d608b83dfc

Owner subscription ID: Current subscription

In-use by subscription(s)

Subscription ID	Description	Product name
e4cadf75	f033c01 OCh042 ba01-bo01 (100Gbps Ethernet)	optical_digital_service

Netbox Id

Port Description: Physically connected to g30.bo01.garr.net port-1/1/1.

Port Name: 1-E1-1-T2A

Used Passbands

Cosa c'è dietro: modelli astratti, modulari e minimali

Workflow Orchestrator "WFO dev TILT" Engine is RUNNING 0

Start / Subscriptions / e4cadf75-4c29-40f3-80fb-08585446ec67

f033c01 OCh042 ba01-bo01 (100Gbps Ethernet) ⚡


active in-sync


Service configuration General Workflows Related subscriptions


Product blocks

Show all Select by name

- ▼ f033c01 OCh042 ba01-bo01 ×
- ▶ g30.ba01.garr.net port-1/1/3 ×
- ▶ g30.bo01.garr.net port-1/1/3 ×
- ▶ och42_ba01-bo01

 f033c01 OCh042 ba01-bo01 Show details	
OpticalDigitalService	
Client Id	1
Flow Id	33
Service Name	f033c01 OCh042 ba01-bo01
Service Type	100Gbps Ethernet

 g30.ba01.garr.net port-1/1/3 Show details	
OpticalDevicePort	
Port Description	f033c01 OCh042 ba01-bo01 remote:g30.bo01.garr.net port-1/1/3
Port Name	port-1/1/3

 g30.bo01.garr.net port-1/1/3 Show details
OpticalDevicePort

Optical Digital Service

dentro alla trama

Cosa c'è dietro: modelli astratti, modulari e minimali

Workflow Orchestrator "WFO dev TILT" Engine is RUNNING 0

Start / Subscriptions / e4cadf75-4c29-40f3-80fb-08585446ec67

f033c01 OCh042 ba01-bo01 (100Gbps Ethernet) ⚡

active in-sync

Service configuration General Workflows Related subscriptions

Product blocks

Show all Select by name

- ▼ f033c01 OCh042 ba01-bo01
 - > g30.ba01.garr.net port-1/1/3
 - > g30.bo01.garr.net port-1/1/3
 - ▼ och42_ba01-bo01 ×
 - > OpticalSpectrum
 - > g30.ba01.garr.net port-1/1/1 ×
 - > g30.bo01.garr.net port-1/1/1 ×

och42_ba01-bo01 OpticalTransportChannel Show details

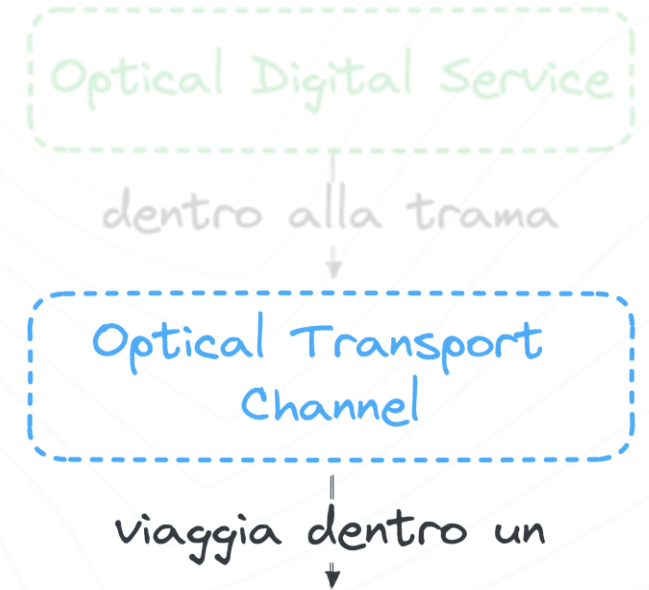
Central Frequency	193500000
Mode	16QAM_200G
Och Id	42

g30.ba01.garr.net port-1/1/1 OpticalDevicePort Show details

Owner subscription ID	g30.ba01.garr.net port-1/1/1 --- flex.ba01.garr.net 1-E3-1-T2A	7b06 743c
-----------------------	--	--------------

g30.bo01.garr.net port-1/1/1 OpticalDevicePort Show details

Owner subscription ID	g30.bo01.garr.net port-1/1/1 --- flex.bo01.garr.net 1-E1-1-T2A	b3ab 3a3b
-----------------------	--	--------------



Cosa c'è dietro: modelli astratti, modulari e minimali

Workflow Orchestrator "WFO dev TILT" Engine is RUNNING 0

Start / Subscriptions / e4cadf75-4c29-40f3-80fb-08585446ec67

f033c01 OCh042 ba01-bo01 (100Gbps Ethernet) ⚡

active in-sync

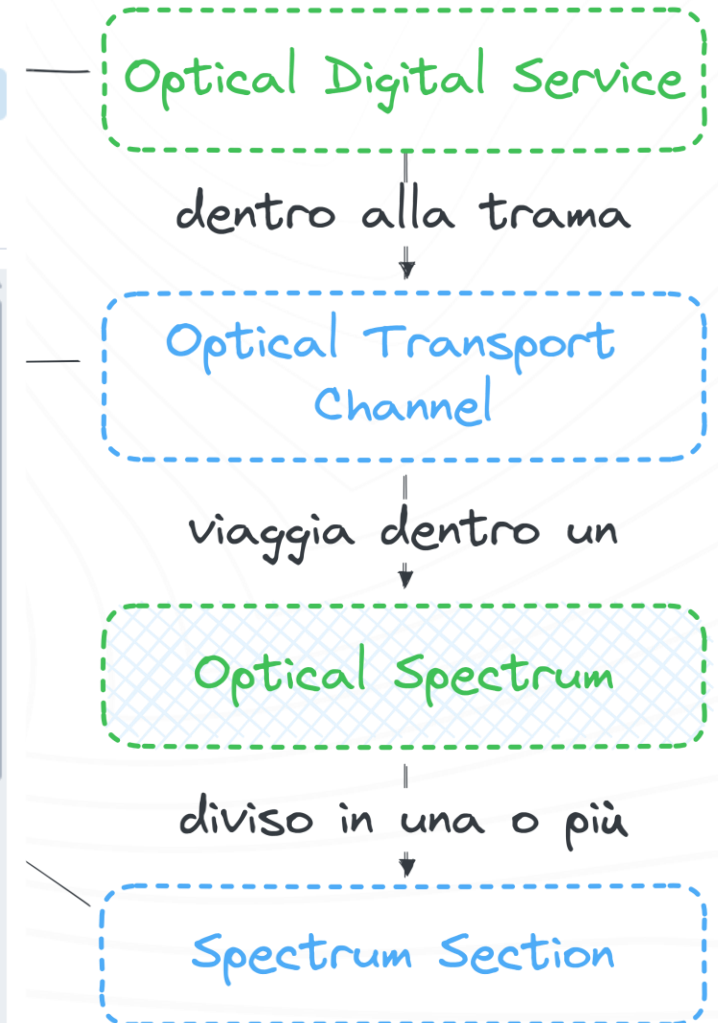
Service configuration General Workflows Related subscriptions

Product blocks

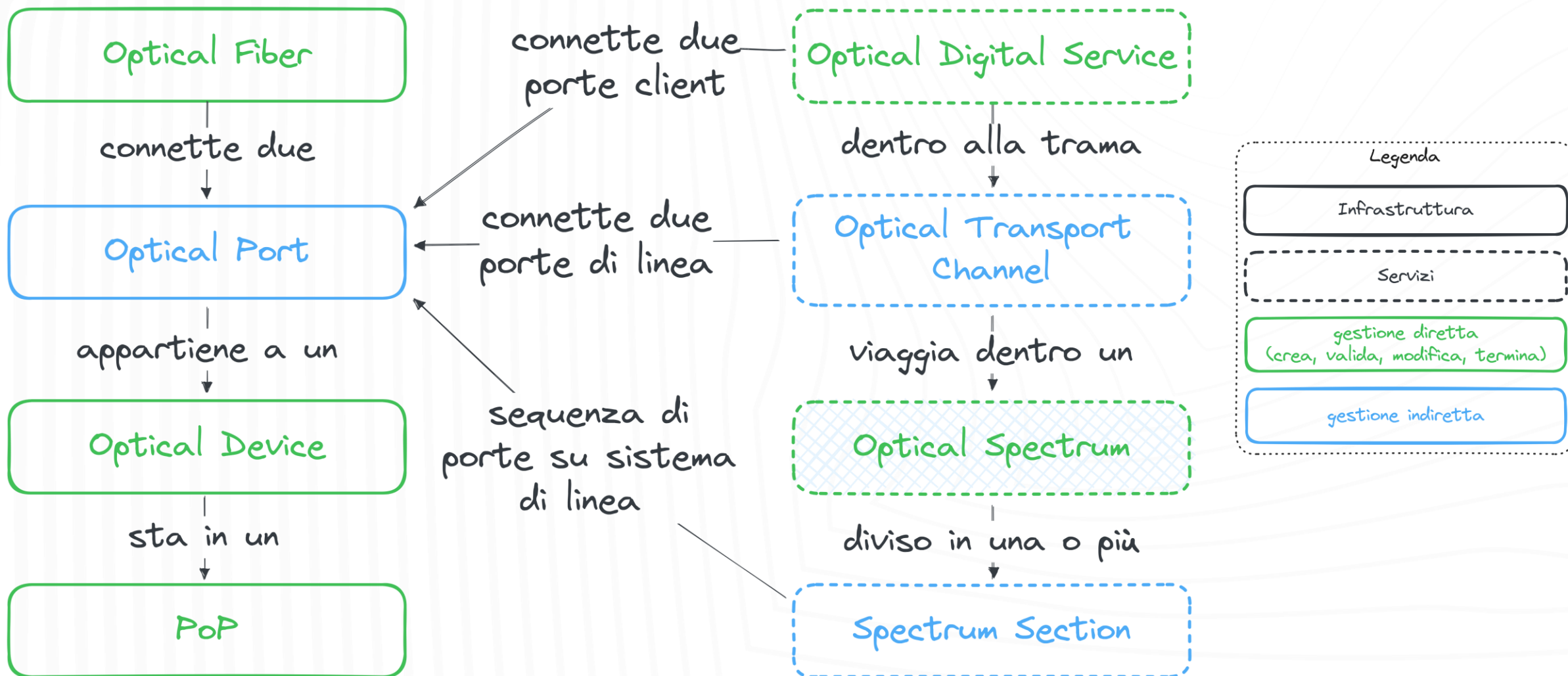
Show all Select by name

- ▼ f033c01 OCh042 ba01-bo01
 - > g30.ba01.garr.net port-1/1/3
 - > g30.bo01.garr.net port-1/1/3
- ▼ och42_ba01-bo01
 - ▼ OpticalSpectrum
 - OpticalSpectrumPathConstraints
 - ▼ OpticalSpectrumSection
 - > flex.ba01.garr.net 1-A-2-L1
 - > flex.ba01.garr.net 1-E3-1-T2A
 - > flex.bo01.garr.net 1-A-1-L1
 - > flex.bo01.garr.net 1-E1-1-T2A
 - > g30.ba01.garr.net port-1/1/1
 - > g30.bo01.garr.net port-1/1/1

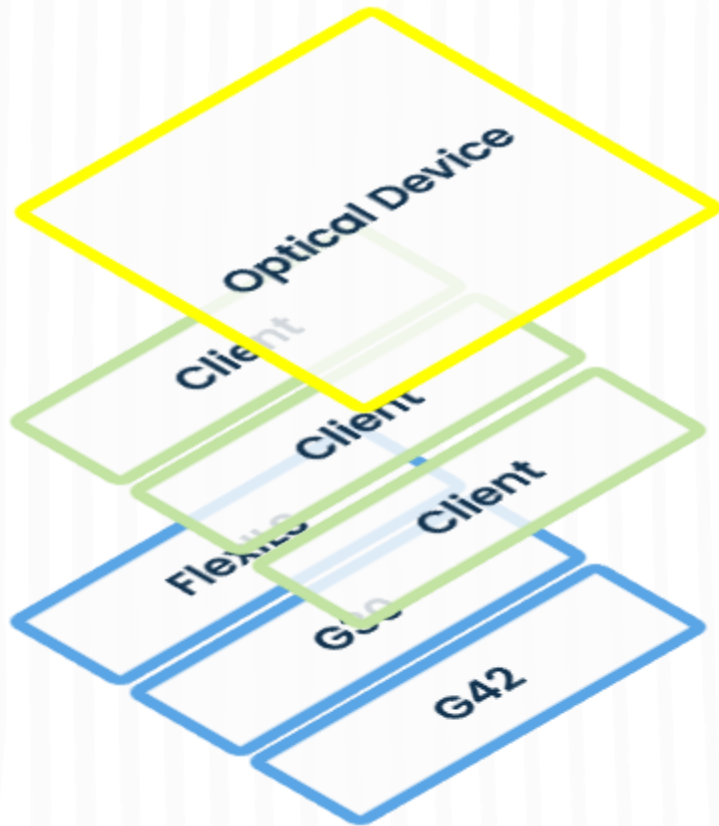
OpticalSpectrum OpticalSpectrum	Show details
Passband	(193475000, 193525000)
Spectrum Name	OCh042 ba01-bo01
OpticalSpectrumSection OpticalSpectrumSection	Show details
flex.ba01.garr.net 1-A-2-L1 OpticalDevicePort	Show details
Owner subscription ID	flex.ba01.garr.net 1-A-2-L1 --- 6e05 flex.bo01.garr.net 1-A-1-L1 0251
flex.ba01.garr.net 1-E3-1-T2A OpticalDevicePort	Show details
Owner subscription ID	g30.ba01.garr.net port-1/1/1 --- 7b06 flex.ba01.garr.net 1-E3-1-T2A 743c



Cosa c'è dietro: modelli astratti, modulari e minimali



Cosa c'è dietro: implementazione degli step **idempotente** e **indipendente** dal tipo di hardware



```
for port in optical_fiber.terminations:
    set_port_admin_state(port.device, port.name, "up")

#---da qualche altra parte nel codice---#
@set_port_admin_state.register(Platform.FlexILS)
def _(device, port_name):
    flex(device.ip).ed_scg(port_name, state="IS")

@set_port_admin_state.register(Platform.G30)
def _(device, port_name):
    g30(device.ip).port(port_name).modify(admin="up")

@set_port_admin_state.register(Platform.G42)
def _(device, port_name):
    g42(device.ip).port(port_name).modify(admin="unlock")
```

Codice e riflessione



<https://u.garr.it/orchestator>



Funziona, strumento abilitante.

Iniziare è impegnativo, poi più veloce e facile di Ansible.

Collegati lo usano perché facilita non perché imposto.

Consente orchestrazione ciclo vita un servizio alla volta.

Codice leggibile, estendibile e manutenibile. Possibile fare leva su LLM.

Organizzazioni con portali self-service adottano approccio simile (DB per storico e desiderato + no-DSL worker + CRUD su config secondo modelli YANG).

01

Matteo Colantonio

Automazione Rete Ottica

02

Filippo Landini

Architettura del Software

WFO out of the box

<https://github.com/workfloworchestrator>



Start: WFO out of the box

success - 9/9/2024, 9:23:52 AM

Duration

00:00:21



Workflow Orchestrator

The Workflow orchestrator project is a group of like minded network operators collaborating on opensource orchestration software

Unfollow

71 followers

Netherlands

<http://workfloworchestrator.org>

workfloworchestrator.board@com...

Popular repositories

orchestrator-core

Public

The workflow orchestrator core repository

Python 60 stars 23 forks

example-orchestrator

Public

Example Workflow Orchestrator implementation

Python 22 stars 9 forks

pydantic-forms

Public

Define JSON scheme with pydantic so a frontend can generate forms with pydantic validators

Python 12 stars

pydantic-forms-ui

Public

NPM package that implements forms generated by the pydantic forms module

TypeScript 12 stars 1 fork

orchestrator-ui-library

Public

Component library for the orchestrator-ui which is published in npm

TypeScript 11 stars 7 forks

Iso

Public

Lightweight Service Orchestrator

Python 10 stars

Top discussions this past month

Discussions are for sharing announcements, creating conversation in your community, answering questions, and more.

[Start a new discussion](#)

People



Top languages

Python TypeScript JavaScript

Go Smarty

WFO out of the box

<https://github.com/workfloworchestrator>



Start: WFO out of the box
success - 9/9/2024, 9:23:52 AM

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71 followers Netherlands <http://workfloworchestrator.org> workfloworchestrator.board@com...

Popular repositories

<p>orchestrator-core Public</p> <p>The workflow orchestrator core repository</p> <p>Python ☆ 60 🍴 23</p>	<p>example-orchestrator Public</p> <p>Example Workflow Orchestrator implementation</p> <p>Python ☆ 22 🍴 9</p>	<h3>Top discussions this past month</h3> <p>Discussions are for sharing announcements, creating conversation in your community, answering questions, and more.</p> <p>Start a new discussion</p>
<p>pydantic-forms Public</p> <p>Define JSON scheme with pydantic so a frontend can generate forms with pydantic validators</p> <p>Python ☆ 12</p>	<p>pydantic-forms-ui Public</p> <p>NPM package that implements forms generated by the pydantic forms module</p> <p>TypeScript ☆ 12 🍴 1</p>	
<p>orchestrator-ui-library Public</p> <p>Component library for the orchestrator-ui which is published in npm</p> <p>TypeScript ☆ 11 🍴 7</p>	<p>Iso Public</p> <p>Lightweight Service Orchestrator</p> <p>Python ☆ 10</p>	

People

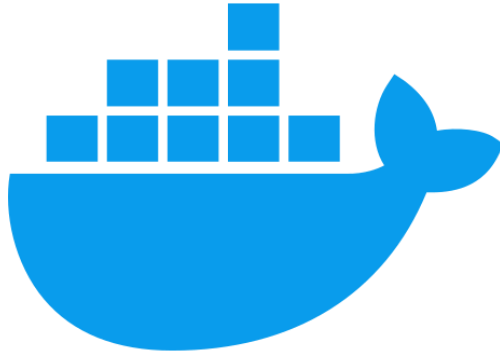


Top languages

Python TypeScript JavaScript
Go Smarty

Example-orchestrator

<https://github.com/workfloworchestrator/example-orchestrator>



The screenshot shows the 'Example Orchestrator' dashboard. The top navigation bar includes the 'Workflow Orchestrator' logo and the title 'Example Orchestrator'. A sidebar on the left contains a menu with items: '+ New subscription', 'Start' (highlighted), 'Subscriptions', 'Workflows', 'Tasks', 'Metadata', 'Settings', 'Example form', 'Search', and 'Agent'. The main content area features a 'Welcome' message, a 'Total active workflows' card showing a green checkmark and a dash, and a 'Most recent active workflows' section with a 'Show all active workflows' button at the bottom.

```
✓ Network example-orchestrator_default Created
✓ Container postgres Created
✓ Container redis Created
✓ Container netbox Created
✓ Container orchestrator Created
✓ Container orchestrator-ui Created
✓ Container rover-compose Created
✓ Container netbox-worker Created
✓ Container nginx Created
✓ Container federation Created
```

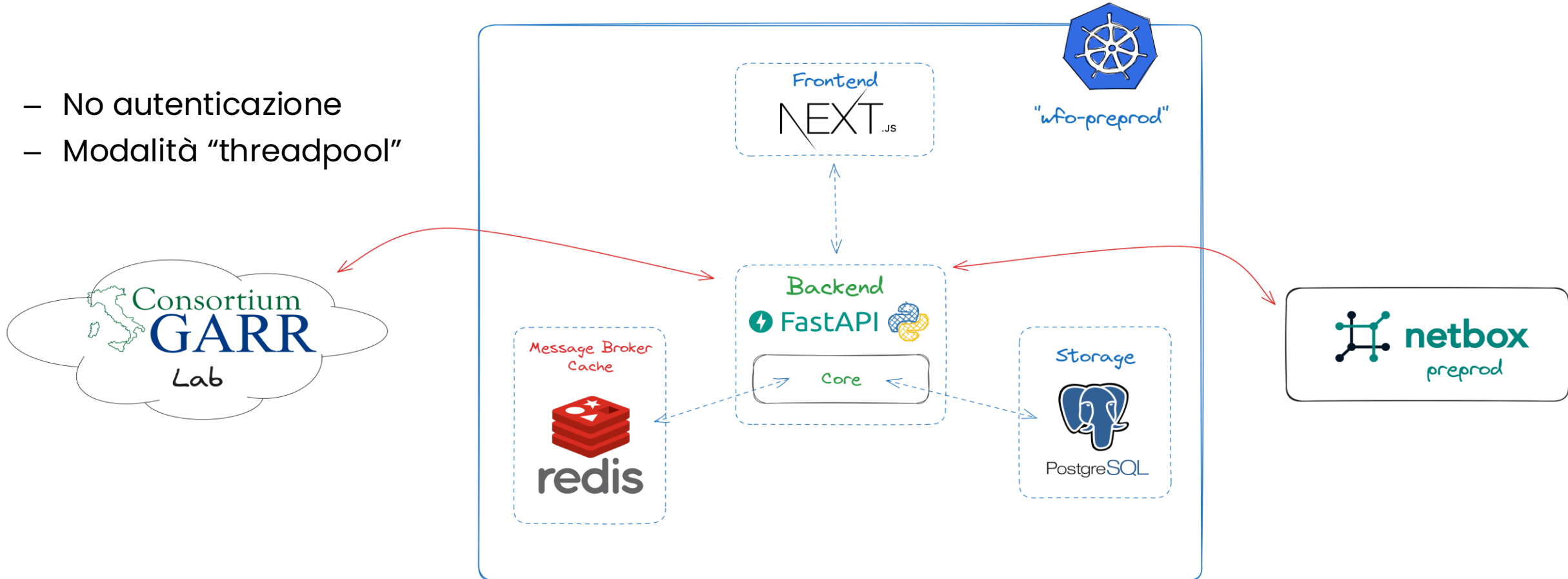
Architettura kubernetes - preprod



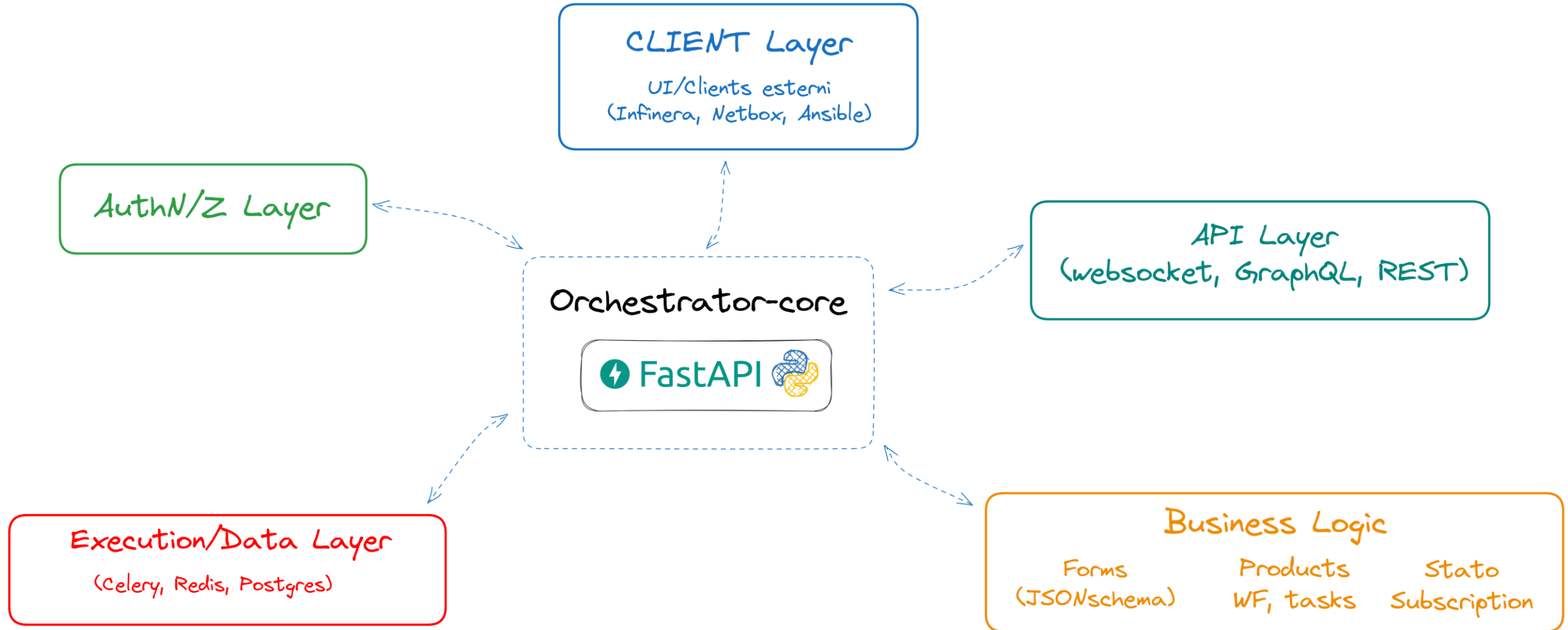
Prototipo funzionante in laboratorio: creazione di un circuito ottico
success - 10/13/2025, 7:23:56 PM

Duration
00:00:01

- No autenticazione
- Modalità "threadpool"



Orchestrator-core

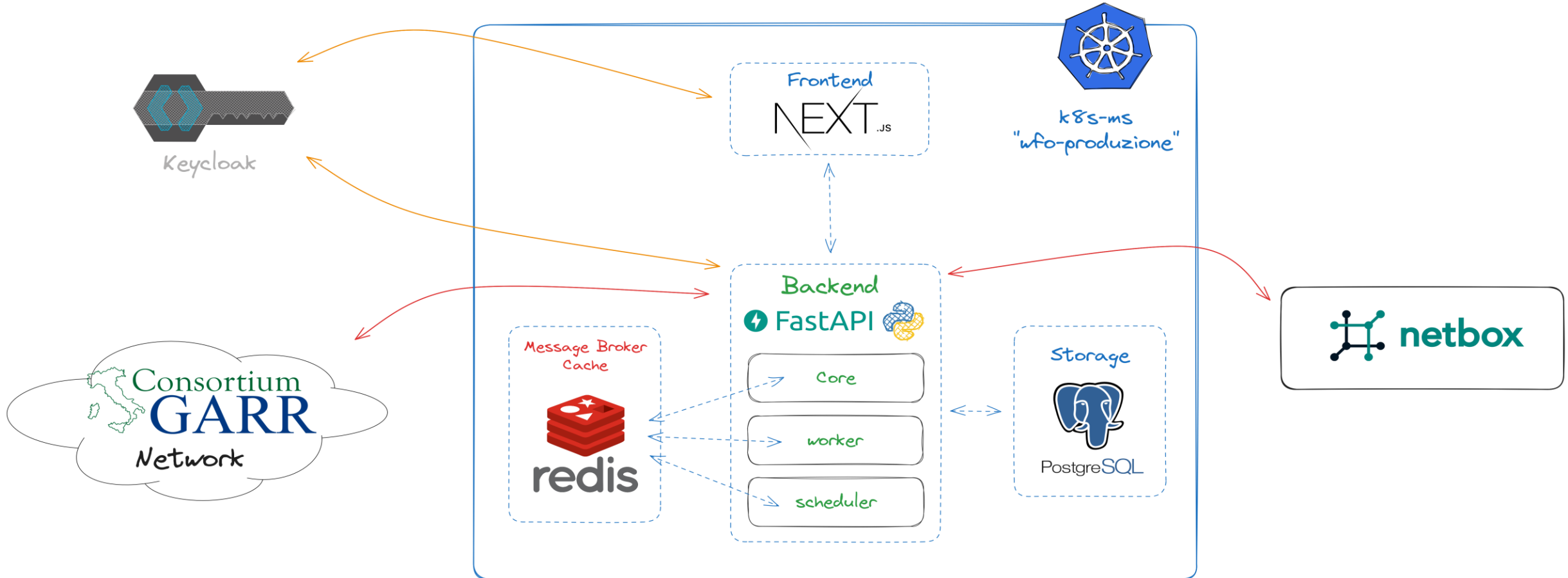


Architettura kubernetes - produzione



Primo servizio in produzione
complete - 3/19/2025, 11:36:03 AM

Duration
16:23:52

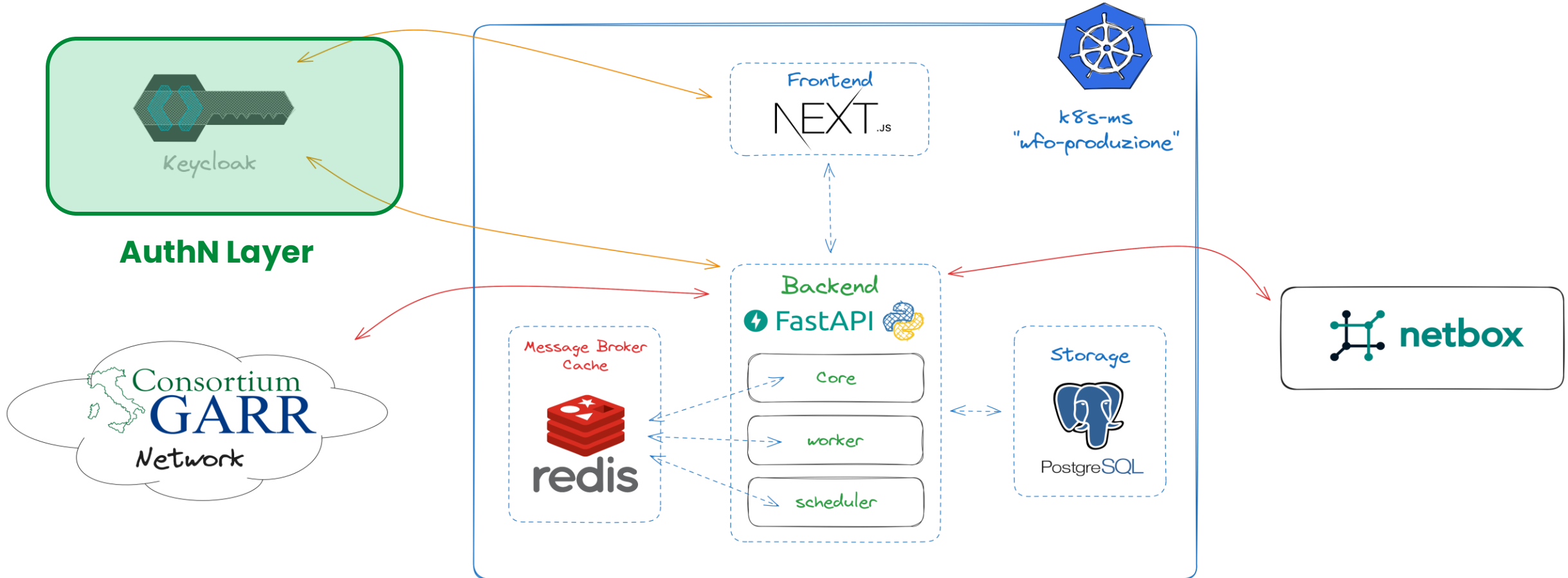


Architettura kubernetes - produzione



Primo servizio in produzione
complete - 3/19/2025, 11:36:03 AM

Duration
16:23:52

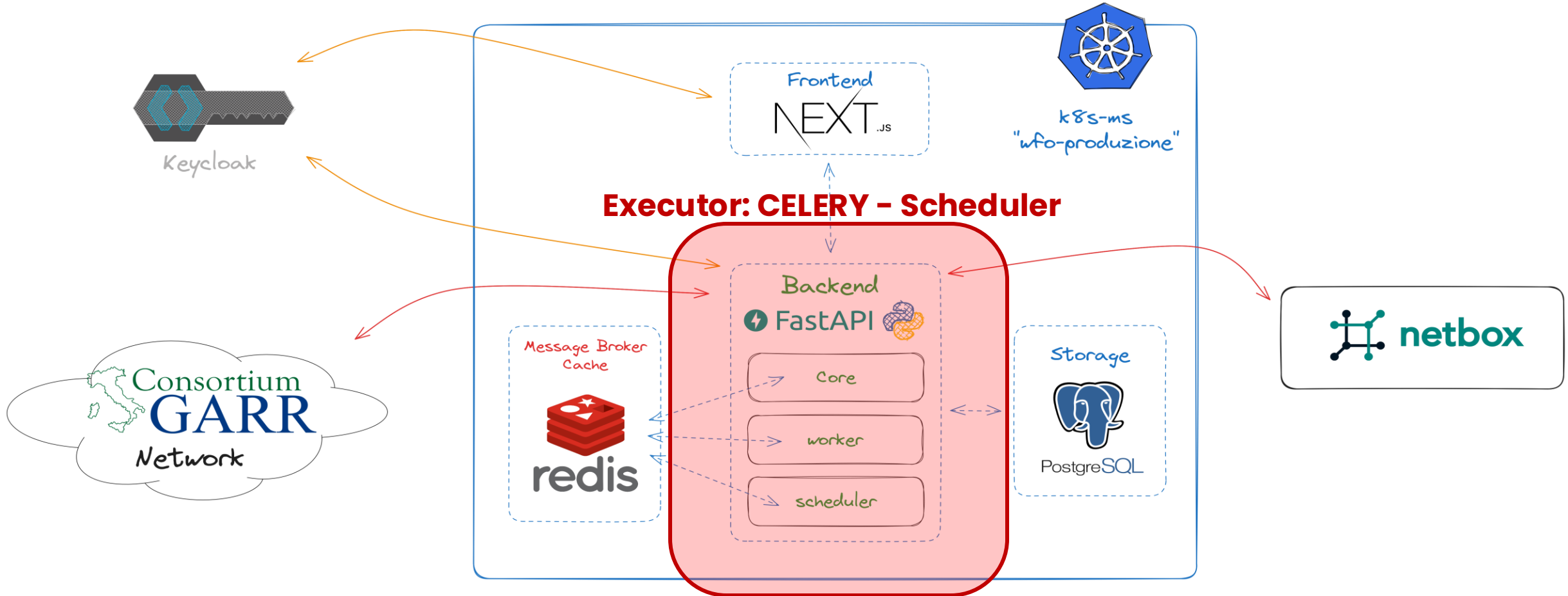


Architettura kubernetes - produzione



Primo servizio in produzione
complete - 3/19/2025, 11:36:03 AM

Duration
16:23:52



Considerazioni su WFO

Pros

- **Status avanzato** e ampio spazio a **personalizzazioni**
- Modellazione **astratta e modulare**
- **Community** estremamente attiva e di supporto

<https://github.com/ConsortiumGARR/GARR-Workflow-Orchestrator>

Cons

- Modellazione complessa, difficile avere soluzione chiavi in mano

Passi successivi



Done ?

complete - 10/30/2025, 6:57:46 PM

Duration

00:00:00

- **Layer autoritativo**
- **Integrazione rete a pacchetto (PACMAN)**

Grazie per l'attenzione!



<https://u.garr.it/orchestator>

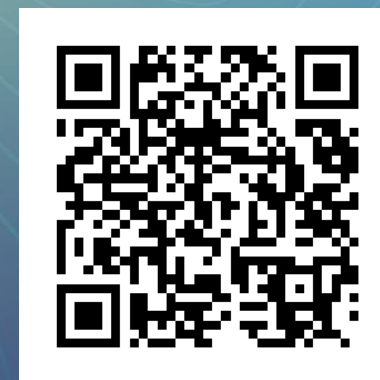
<https://github.com/workfloworchestrator>

<https://workfloworchestrator.org>

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