



# Registroit

L'ANAGRAFE DEI DOMINI .IT

REGISTRO .IT È GESTITO DA

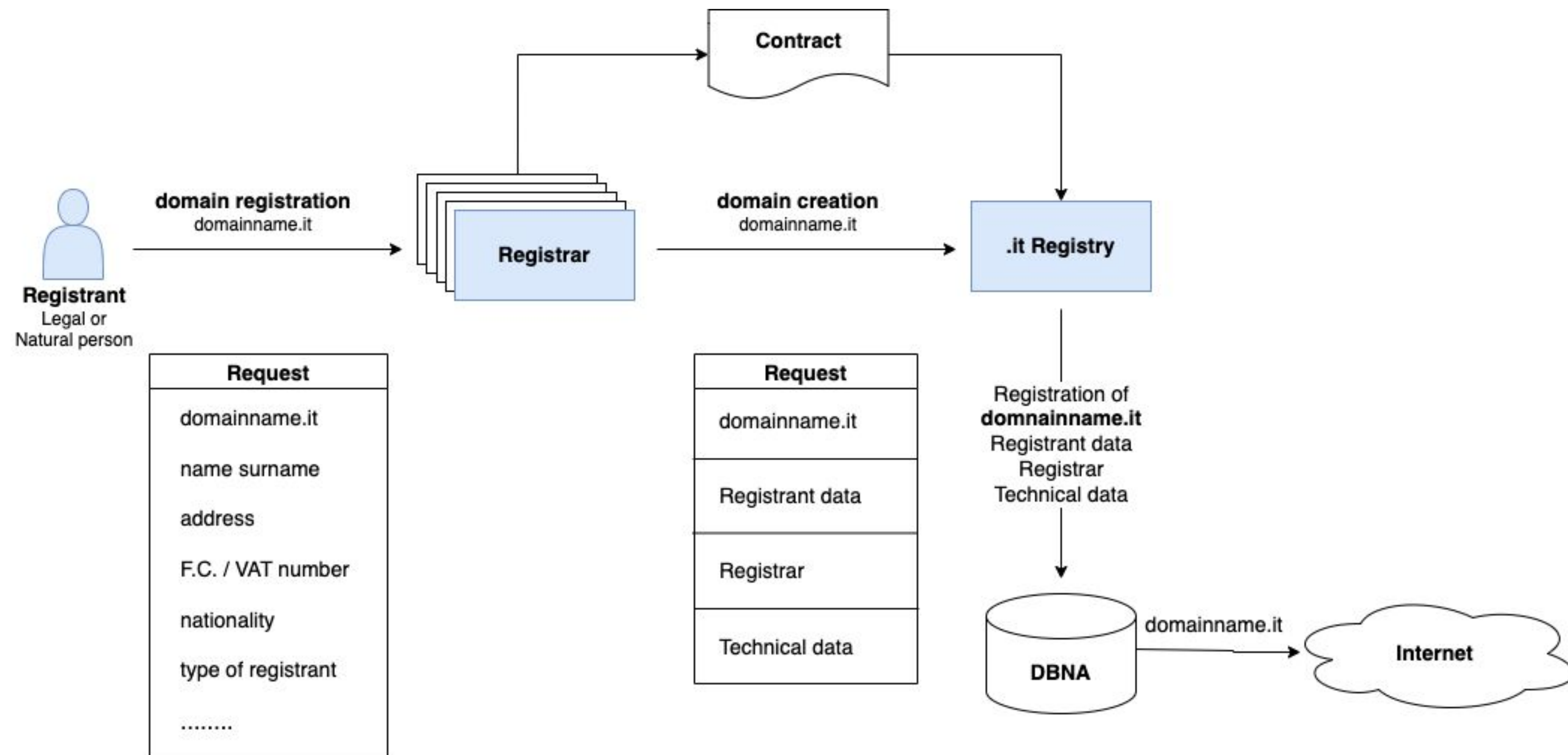




# An anomaly detection system of the .it Registry database

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# The process of registering .it domain names



# Why verify the accuracy of registrant data?



- Ensures the **reliability** and **quality** of the data contained in the .it Registry database
- Prevents and mitigates the impact of any **security incidents** involving domain names
- Prevents the “**crime of impersonation**” as stated in Article 494 of the Italian Criminal Code
- Ensures **compliance** with **GDPR**: personal data must be “**accurate** and, if necessary, **updated**; all reasonable measures must be taken to promptly delete or rectify inaccurate data with respect to the purposes for which they are processed (accuracy).”
- Some examples of incorrect data provided by registrants include:
  - false names (whether legal entities or individuals)
  - incorrect and inconsistent fiscal code with the corresponding name
  - non-existent addresses
  - invalid VAT numbers

# Applications created by the .it Registry



- The .it Registry has developed two applications:
  - **READS** (REgistry Anomaly Detection System), it is an application accessible exclusively to the **.it Registry** that analyzes registrants data and detects any anomalies
  - **DARWIN** (Data Accuracy Registrar Web INterface ), a dedicated application:
    - allows **Registrars** to manage and correct anomalies detected by READS
    - enables the **.it Registry** to monitor the status of submitted requests and validate the changes made by Registrars

# READS



- A **semi-automatic** system has been designed and implemented to analyze registrant data using **NLP techniques, heuristics, and external services**
- For each registrant contained in the DBNA, an **anomaly score** is calculated to identify the severity of any detected anomalies
- Specifically, the system analyzes the following information:
  - name and organization
  - address
  - fiscal code/VAT number
  - nationality
  - registrant type

# Anomaly Score



The anomaly score is based on the checks performed on the relevant fields:

- **Syntax validity of name/address** through **Deep Learning** classifiers.
- The **probability of the name/address belonging to a certain language** is calculated (language identification).
- Check if an address is recognized by **Open Street Map** service.
- Check the match between **syntax of the fiscal code** and **registrant's name**.
- Check the match between company name, VAT number, and address using the **VIIES** (Vat Information Exchange System) service provided by the European Commission.

# Registrant Aggregation



- In an ideal scenario, a registrant would have multiple domains under a single contact
- However, in reality, it is not rare to have the same registrant replicated multiple times, resulting in many contacts in the Registry database that correspond to a single real registrant
- Furthermore, unfortunately, it often happens that the same registrant is duplicated with some variations in data, such as:

CNR | via Giuseppe Moruzzi 1, 56124, Pisa, Italy

C.N.R. | via G. Moruzzi 1, 56124, Pisa, Italy

CNR | via Moruzzi 1, 56124, Pisa, Italy

CNR | via Giuseppe Moruzzi 1, 56124, Pisa, Italy



# Registrants aggregation<sup>(Cont)</sup>



Registrants are aggregated if the following fields match:

- **RegCode** (VAT number/Fiscal Code)
- Normalized **Organization** (lower case, removed the punctuation and tokens sorted "My Beautiful Company s.p.a." --> "beautifulcompanymyspa", "spa my beautiful company" --> "beautifulcompanymyspa")
- Entity **Type**
- **Country**
- **Nationality**
- **City and State**

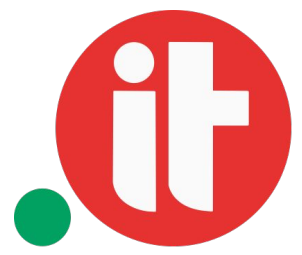
# The Candidate



- It represents an aggregation of registrants objects that are correct and verified through the VIES system
- If present, it will be displayed as a reference in the READS and DARWIN systems, allowing the comparison of data with other aggregation of registrants
- It is visible only to the Registry operators



# What can the operator do with READS?



- Verify data and associated anomalies of aggregated registrants
- Correct any false positives or false negatives
- Send requests to **DARWIN** for anomalies correction by Registrars

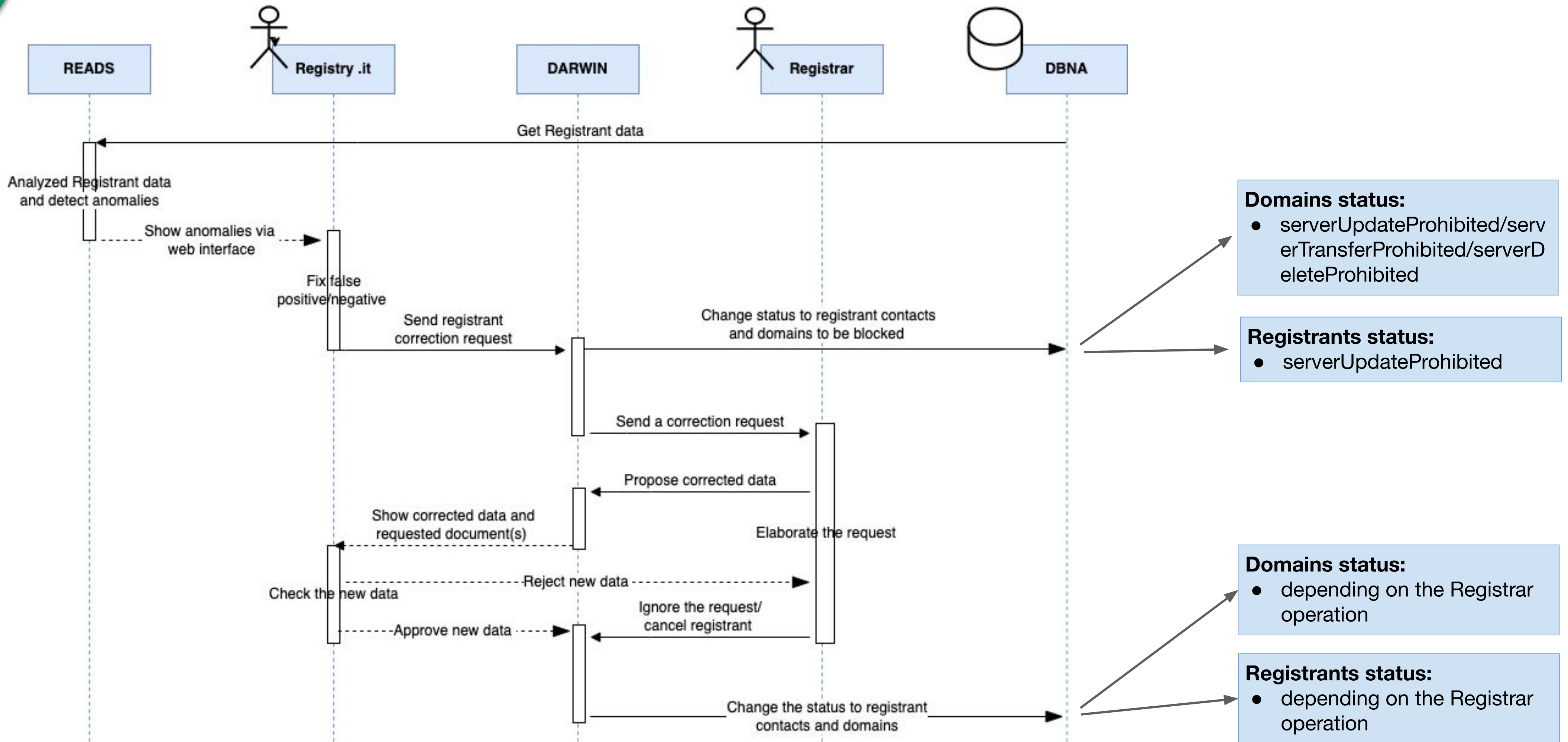


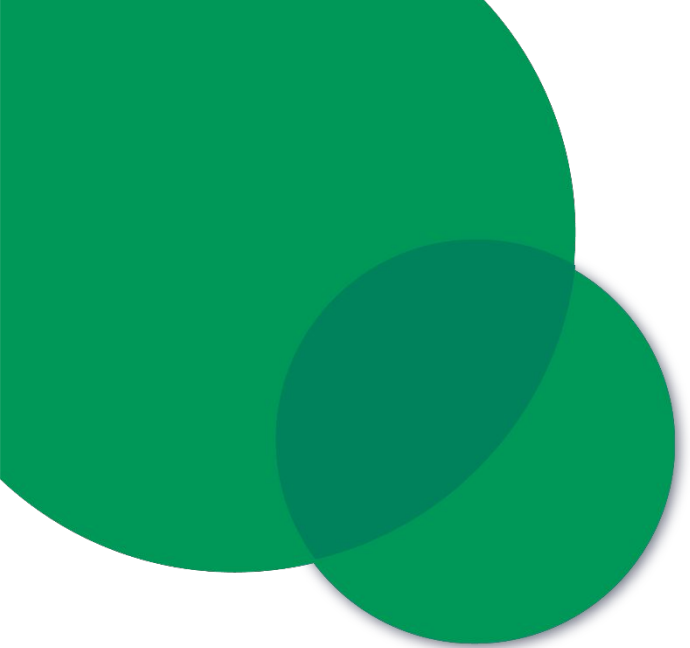
# DARWIN



- An application dedicated to managing the anomaly correction requested by **READS**
- **Registrars** can correct anomalies and submit any required documentation
- **Registry** can validate the corrections made by the Registrars
- Each **request** is related to a **registrant aggregation** calculated by READS
  - potentially impacting one or more registrant contacts in the DBNA
- **DARWIN** interacts with domains and contact objects in the DBNA, making necessary modifications

# READS and DARWIN interaction






# READS & DARWIN

## Web UI

# READS UI



**READS**  All registrants .it Requests Registrars anomalies About the project arianna.delsoldato

## Analyzed Registrants in .it domains

Last update: 13/06/2023 00:34:46  
Registrants: 300

Coded RegCode Priority shown: All Filter columns value to filter Show/Hide column

Registrant data						Domains	N° of registrant	Registrars	Status	Ano... score	Score chart	Candidate registrant
Org	Name	Type	Address	Country ID	Nationality							
▶ RegCode: 02118311006 (1 Items(s) / 160 Items(s))												
▼ RegCode: 04747641001 (114 Items(s) / 114 Items(s))												
T... Editore S.p....	Tel... ore S.p....	2	via Vinicio Cortese, ... via Vinicio Cortese, ...	it	it	t...nsulpec.it, studi...	22	...EB-REG, TELE...	Candidate	0.120		★
E...SSIMO	EL...SSIMO	2	LARGO PRIMO MA...	it	it	st...ssimo.it	1	...EB-REG	Completed	0.120		🗨️
M...rimaldi	M...rimaldi	2	viale delle ferriere 2...	it	it	st...rimaldiudine.it	1	...EB-REG	In Progress	0.849		
LC...	PACLO LOI	2	VIA MANNIRONI 9,...	it	it	st...bi.it	1	...EB-REG	To Process	0.864		
B...ROBERTO	BE...ROBERTO	2	VIA SLATAPER 12, ...	it	it	s...neroberto.it	1	...EB-REG	To Process	0.849		
C...CARMELI...	C...CARMELI...	2	VIA RAFFAELE CA...	it	it	s...docdce.it	1	...EB-REG	To Process	0.849		
S...GO	S...GO	2	via M. FANTI, 12, 1...	it	it	s...raugo.it	1	...B-REG	To Process	0.849		
S...	A...SETTE	2	VIA GARIBALDI 20...	it	it	s...niasette.it	1	...EB-REG	To Process	0.849		

First Prev 1 2 **3** 4 5 Next Last

# READS UI (Cont)



## Details of the registrant's anomalies

### ANOMALIES ASSOCIATED WITH THE REGISTRANT

This data could be associated with multiple Registrant object with the same VAT number/Fiscal code, org and similar postal address.

Set priority: High

Field	Value	Anomaly	Change correctness
RegCode	02338780	VAT name anomaly VAT address anomaly Many different registrants with this regcode	Set OK
Registrant data			
Name	ALBERTO SE		
Org	GRUPPO F	Name inconsistent with VAT validation	Set OK
Type ID	2		
Address	VIA CARLO FORTI, 67100, L'AQUILA, AQ, it	Address inconsistent with VAT validation	Set OK
Address	VIA SANTA GIUSTA, 67100, L'AQUILA, AQ, it	Address inconsistent with VAT validation	Set OK
Address	VIA SANTA GIUSTA, 10, 67100, L'AQUILA, AQ, it	Address inconsistent with VAT validation	Set OK
Country ID	it		
Nationality	it		Set not OK
Anomaly Score	0.639		
Submit changes			

### VIES CHECK ON VAT NUMBER

VAT number: 02338780

Found: True

Date of request: 22-06-2020

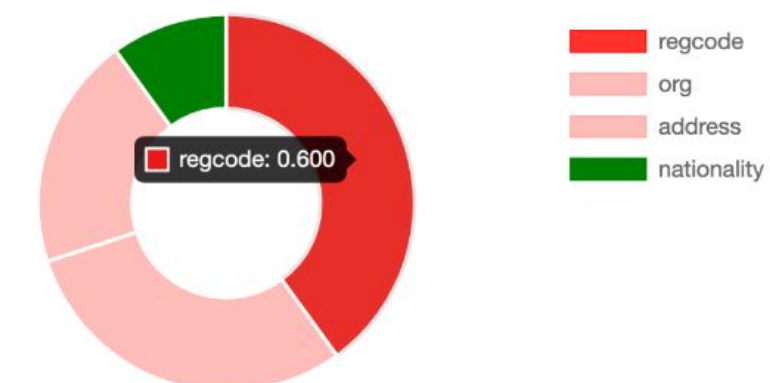
Name: NK S.R.L.. Anomaly score: 0.300

Address: VIA NAPOLI 14 66043 CASOLI CH Anomaly score: 0.120

Member State: it

Check carried out with the service of the European Commission VIES

### ANOMALY SCORE: 0.639



### DETAILS:

DOMAIN FIELD CHECKED: REGCODE - ANOMALY SCORE ON FIELD: 0.600

Evaluated parameter	Anomaly score details
VIES check failed	0.420
VAT name anomaly	0.300
VAT address anomaly	0.120
VAT number not found	0
Irregular Fiscal Code or VAT number	0
Many different registrants with this regcode	0.180



# READS UI (Cont)



Submit changes

### DOMAINS REGISTERED BY THE REGISTRANT

Filter columns  Export table

Number of domains: 4/4

Domain	Status	Registrant	Created	Last update	link to MIDA
▼ Registrar: OVH-REG					
finherr.it		Contact Id: DUP576683872 Org: GRUPP...NOVA Address: VIA CARLO FORTI, 6...	22/02/2015	20/07/2022	
gruppolink.it		Contact Id: DUP061155690 Org: GRUPP...NOVA Address: VIA SANTA GIUSTA, ...	21/12/2015	08/01/2022	
innovafin.it		Contact Id: DUP987765919	29/06/2018	28/06/2022	

First Prev 1 Next Last

### SEND ANOMALIES TO REGISTRAR

Select the registrar to which you want to send the information to be corrected.  
Possibly enter additional information that may be useful.

Select a Registrar:

- ...R-REG
- ...REG

Note:

Check VAT data

Send anomalies

Request documentation relating to the Registrar:

- Chamber of Commerce registration
- Deed of Incorporation
- Certificate of attribution of FC / VAT num.
- Other

Insert a type of document

VAT address anomaly 0.120

VAT number not found 0

Irregular Fiscal Code or VAT number 0

Many different registrants with this regcode 0.180

VALUE: 023387806

# READS UI (Cont)



READS .it All registrants .it Requests Registrars anomalies About the project arianna.delsoldato

## Details of the registrant's anomalies

! Registrant data has been sent to the Registrar OVH-REG for the corrections of the anomalies.  
Modifications and sending of anomalies are not temporarily permitted.  
Status of the request: SUBMITTED.

### ANOMALIES ASSOCIATED WITH THE REGISTRANT

This data could be associated with multiple Registrant object with the same VAT number/Fiscal code, org and similar postal address.

Set priority: High

Field	Value	Anomaly	Change correctness
RegCode	02338780	VAT name anomaly VAT address anomaly Many different registrants with th	Set OK
Registrant data			
Name	ALBERTO S		
Org	GRUPPO	Name inconsistent with VAT valid	Set OK
Type ID	2		
Address	VIA CARLO FORTI, 67100, L'AQUILA, AQ, it	Address inconsistent with VAT va	Set OK
Address	VIA SANTA GIUSTA, 67100, L'AQUILA, AQ, it	Address inconsistent with VAT va	Set OK
Address	VIA SANTA GIUSTA, 10, 67100, L'AQUILA, AQ, it	Address inconsistent with VAT va	Set OK
Country ID	it		
Nationality	it		Set not OK
Anomaly Score	0.639		

Submit changes

### VIES CHECK ON VAT NUMBER

VAT number: 02338780

Found: True

Date of request: 22-06-2020

Name: S.R.L. Anomaly score: 0.300

Address: VIA NAPOLI 14 66043 CASOLI CH Anomaly score: 0.120

Member State: it


Check carried out with the service of the European Commission VIES

### ANOMALY SCORE: 0.639

DETAILS:  
Move over an area of the graph to see the details.








# DARWIN - Registrar UI



darwin  Requests Expiring requests h-reg EN

Dashboard

Dashboard Registrar

 Pending 1	 Registrar updated 0			
 Processing 0	 Completed 0	 Expired in processing 0	 Expired 0	 Expiring in 7 days 0

# DARWIN - Registrar UI (Cont)



darwin Requests Expiring requests it-reg EN

Dashboard > Requests > Request: 36

Id: 36 Created: 06/06/2023 16:35 Status: Pending < Previous C Next

Report Contacts (3) Domains (3) Variation Proposal

### > Registrant Card

Chosen Registrant Data with reported anomalies

	Contact ID	D
	Name	Al
	Org/Name	GRUPP [redacted] IOVA
	RegCode (PI/CF)	02338780
	Nationality	IT - Italy
	EntityType	2 - Company
	City	L'AQUILA
	Street	VIA SANTA GIUSTA
	State	AQ - L'Aquila
	Postal code	67100
	Country	IT - Italy
	Phone	+39.0872 [redacted]
	Email	info@grup [redacted]
	Consent to Publication	YES
Creation Data	23/12/2020, 00:50	
Last update	06/06/2023, 16:35	

### > Associated resources

Affected contacts: 3

Affected domains: 3

### > Request deadline

Days left: 30

Opening: 06/06/2023

Expected expiration: 06/07/2023

### > Event History: 1

Page 1 of 1

06/06/2023 16:35	Pending Request
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Registrato.it

### > Documents

Required Documents

Registrant typology: 2 - Company

### > Amendment proposal

- Process - proceeds with the creation of the modification proposal to be sent to the Registry

# DARWIN - Registrar UI (Cont)



darwin .it Requests Expiring requests it-reg EN

Dashboard > Requests > Request: 36

Id: 36 Created: 06/06/2023 16:35 Status: Pending < Previous C > Next

Report Contacts (3) Domains (3) Variation Proposal

### Variation proposal

By following the steps listed, it is possible to send the .it Registry a modification proposal useful for correcting the reported anomalies.

Select Contacts Registrant Data Documents Confirm changes Completed

Select the contacts to edit Correct anomalous data Add required documents Verify and send changes

#### Contact Selection

To manage the changes to be applied to the Registrant Contacts, the following three lists can be used.

- To update - apply the same changes to all selected contacts
- Do not update - puts the domains associated with the selected contacts in Hold
- To be deleted - delete selected contacts and associated domains

Sposta TUTTI i contatti nella lista:

To be updated Not to be updated To be deleted

Contacts to Update (3) Contacts not to be updated (0) Contacts to Delete (0)


Contact ID	Name	Org	Last update	Domains	Status	Action	Select
DUP576683872	ALBERTO [REDACTED]	GRUPPO [REDACTED] OVA	06/06/2023, 16:35	1	locked	Not to be updated To Delete	detail
DUP061155690	ALBERTO [REDACTED]	GRUPPO [REDACTED] OVA	06/06/2023, 16:35	1	locked	Not to be updated To Delete	detail
DUP987765919	ALBERTO [REDACTED]	GRUPPO [REDACTED] OVA	06/06/2023, 16:35	1	locked	Not to be updated To Delete	detail

< 1 >

Calendar icon










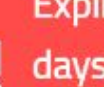
# DARWIN - Registry UI



darwin  Requests Expiring requests Search Arianna Del Soldato EN

Dashboard

Dashboard Registry Operator

 Pending 0		 Registrar updated 1					
 Processing 0	 Completed 16	 Expired in processing 0	 Expired 14	 Rejected 3	 Annullate 0	 Submitted 0	 Expiring in 7 days 0

# DARWIN - Registry UI (Cont)



darwin .it Requests Expiring requests Arianna Del Soldato EN

Dashboard > Requests > Request: 60

Id: 60 Created: 06/06/2023 16:19 Status: Registrar updated

Note Check the VAT data

Report Contacts (2) Domains (2)

### > Registrants Card

Abnormal Registrant / Registrar changes In validation

	Contact ID	DUP576683872
	Name	ALBERTO SE [redacted]
	Org/Name	[redacted] K SRL [redacted]
	RegCode (PI/CF)	023387806 [redacted]
	Nationality	IT - Italy
	EntityType	2 - Company
	City	CASOLI [redacted]
	Street	VIALE NAPOLI 14 [redacted]
	State	CH - Chieti [redacted]
	Postal ode	66043 [redacted]
	Country	IT - Italy
	Phone	+39.0 [redacted]
	Email	info@ [redacted]
	Consent to Publication	YES
	Creation Data	04/07/2021, 00:56

Registrant

Contact ID	ARU75341R-845306
Name	ALBERTO SE [redacted]
Org/Name	[redacted] K SRL
RegCode (PI/CF)	023387806 [redacted]
Nationality	IT - Italy
EntityType	2 - Company
City	CASOLI
Street	VIALE NAPOLI 14
State	CH - Chieti
Postal ode	66043
Country	IT - Italy
Phone	+39.0 [redacted]
Email	info@ [redacted]
Consent to Publication	YES
Creation Data	18/04/2022, 15:12
Last update	18/04/2022, 15:12

Candidate Registrant Data

Candidate

[redacted] A-REG

### > Request deadline

Opening 06/06/2023

Days left 27

Expected expiration Waiting for re-processing



# Future works



- Human in the Loop
- Identification of domain names used for malicious activities (ie: DGA, cyber/typo-squatting)
- Phone numbers and emails analysis
- Web content analysis





# Questions?

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